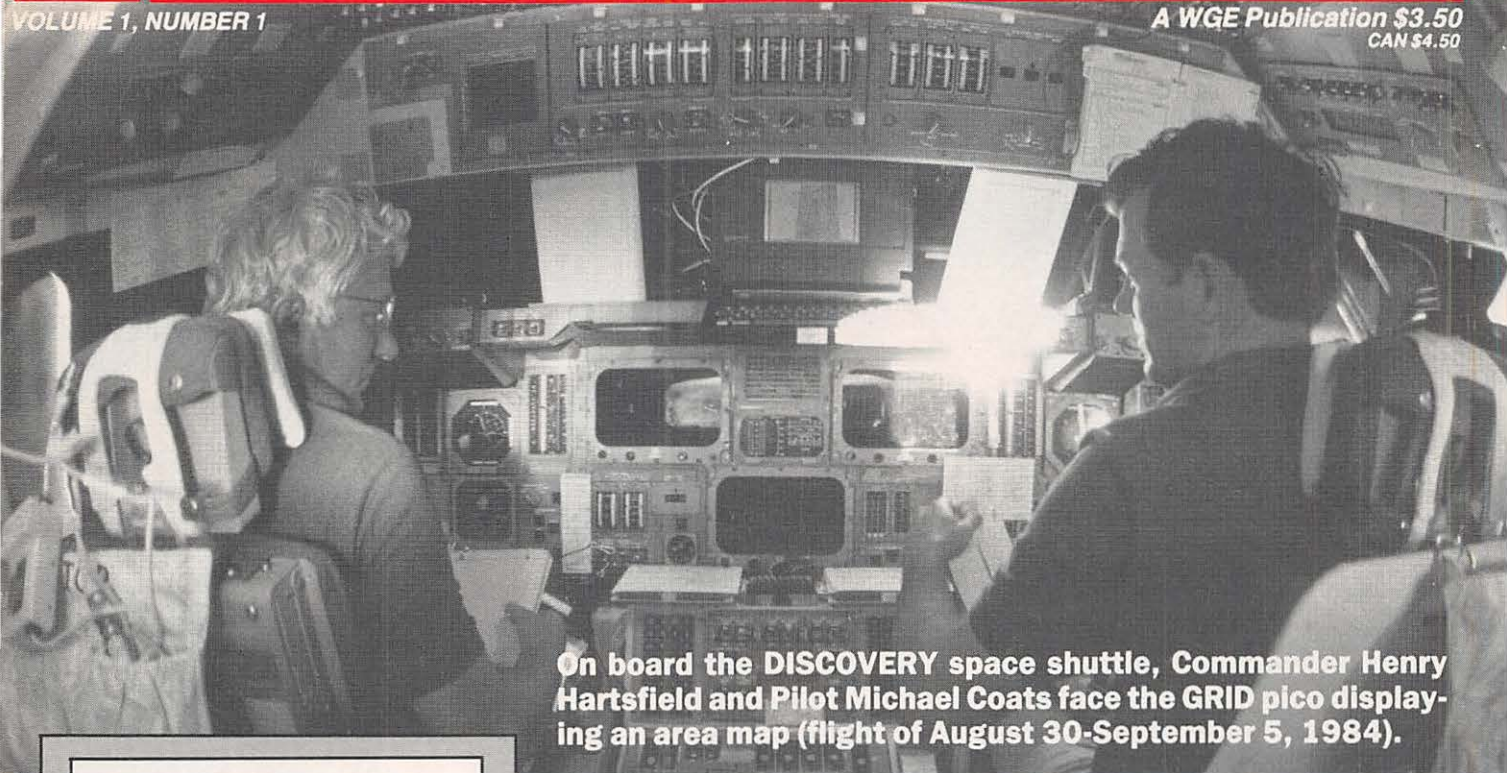


# PICO's

## JOURNAL

### OF BRIEFCASE COMPUTING

VOLUME 1, NUMBER 1

A WGE Publication \$3.50  
CAN \$4.50

On board the DISCOVERY space shuttle, Commander Henry Hartsfield and Pilot Michael Coats face the GRID pico displaying an area map (flight of August 30-September 5, 1984).

Top Photo: Smithsonian Institution/Lockheed Corporation and Threshold Corporation.

## Inside

- Rolls Royce of the Picos, the GridCase 2 has the power and features of a desktop . . . and more.
- Why did CP/M lose out to MS-DOS?
- The Tom Thumb of picos, Access, is custom-tailored to fit.
- Profits are the result when Prospecting software manages your customer database.
- The information revolution strikes on campus.
- EXTRA! We went to the fair for you in Las Vegas: COMDEX impressions.
- International picoists, check our global electrical chart.

## The GridCase 2: Up Close

by Alex Lane

**T**here's no question about it—if you're looking for an IBM PC-compatible picocomputer with the potential of desktop computing power, the GridCase 2 is a front runner. If your bank account can stand the strain, this Grid brings a full-sized back-lit liquid crystal display (LCD) screen, a built-in 720K disk drive, and a full line of peripherals.

The GridCase 2 is a far cry from what I call "minimal machines"—picos that are hobbled by mediocre displays, slow internal modems, undersized RAM memories, gimcrack keyboards, or a combination of these. Its designers' attention to detail is shown, for example, in its metal magnesium case which provides a rugged enclosure and improves heat dissipation. A velcro wrapper secures the carrying handles of the computer's leather and fabric carrying case. If we were talking cars here, we'd be talking Rolls Royce.

Closed, the GridCase 2 is a rectangular black slab measuring roughly 12 by 15 by 2 inches. I found it to be a dense machine, weighing 12 pounds—definitely a "pick-it-up-with-both-hands" pico. Screen-release latches are located toward the front on the left and right sides. The 3½-inch disk drive is on the right-hand side, toward the rear. The battery compartment and all of the GridCase 2's connectors are on the back side and include IBM-type serial (RS-232) and parallel (Centronics) connectors, a 50-pin external bus, a receptacle for external



*The GridCase 2 has all the potential of a desktop—a definite front runner—if your bank account can take the strain.*

—continued on page 6





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# Notice To Readers

January 1, 1986

Dear *Pico* Reader,

Your interest in briefcase computers says a lot about you. You have the foresight to see the potential of laptop computer portability and you are willing to break ground with this new technology. Beginning with this issue, *PICO* will become *PICO's Journal of Briefcase Computing*.

The *Journal* will focus on you, the pico user, and your need for practical, workable applications of portable computing. The new format will cut our editorial lead time in half so you receive more valuable information, sound advice, and useful applications on a more timely basis.

As with all innovations, it takes a little while for the marketplace to catch up with new technology. To take advantage of the briefcase computer industry's pioneering efforts, *PICO's Journal of Briefcase Computing* will offer networking with other laptop owners, as well as reports of new developments and products.

*Journal* features will include:

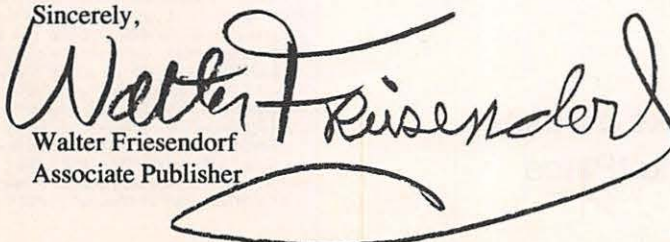
- Information that will keep you in the forefront of briefcase computer technology and applications.
- Tips for your increased enjoyment, knowledge and profit.
- Free programs including valuable applications in word processing, data management, and improved operations.
- An inexpensive classified advertising section that will enable you to network with other laptop owners.
- An array of product reviews—your complete pico marketplace.
- On target coverage of products and publications to improve your pico productivity.
- Fascinating industry trends and trend-makers.
- More interviews with enthusiastic owners (you perhaps?).

And there's even more in store for you with the complete *PICO* group of publications for briefcase computing. As a *PICO* subscriber, you will receive:

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We're changing to reflect the needs of our readers. We would welcome your reaction and comments on our changes in the months to come, and look forward to your participation in *PICO's Journal of Briefcase Computing*.

Sincerely,



Walter Friesendorf  
Associate Publisher





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# Sudden Memory Loss

by Wayne Green

**A**m I the *only* pico user who has suffered the massive trauma of sudden memory loss? I've been through it so often now I'm beginning to appreciate the value of backing up my files on tape, as much of a nuisance as it is.

The first time I managed to cold start my 100 was when I was struggling to get it to dump something into Compuserve. I managed to hit the right keys to completely erase the memory. English, notoriously weak when it comes to handling the expression of feelings, was totally inadequate when I realized what had happened. Perhaps no language could handle such an emotional overload.

## Great Expectations

The files which I've built up in my pico are personal and precious. I add names to my address file carefully, not with any expectation of accidentally losing them later. Dates are entered in my calendar which are important—meetings with people, talks I'm supposed to give. Many of these can be reconstructed, but it isn't easy. Have these occasional total memory losses been something which I alone have been suffering, or have you been through this disaster and kept quiet about it?

I suggest it is time for pico users to consider a mass attack on the problems which bring about this catastrophe with an eye to eliminating that obviously life-shortening surprise. Frankly, I wonder if I might be justified in bringing a shortened-life suit against Radio Shack. Would any jury award less than \$2 million for the aggravation I've suffered?

## The Rigors of the Frontier

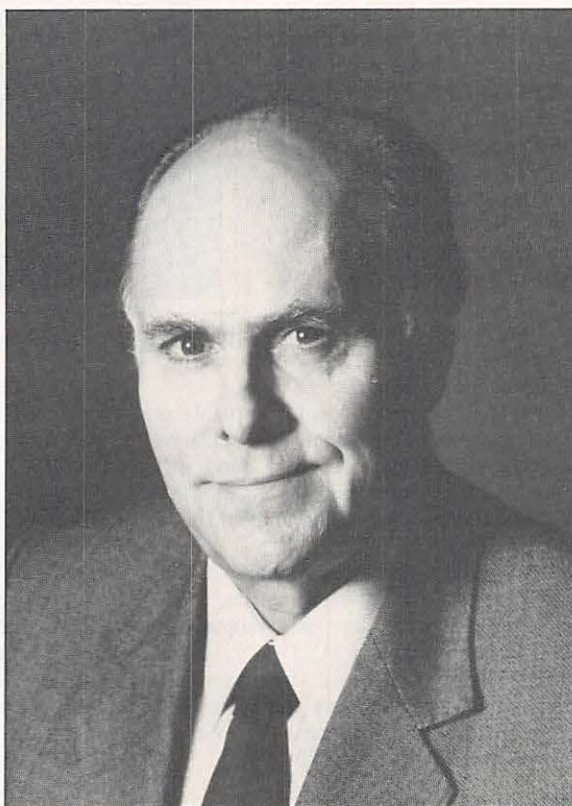
Perhaps I get it in the neck more often than you. I'm one of the first to get new

memory expansion products—and, much to the destruction of my endocrine system, one of the first to suffer when these products viciously turn on me and destroy my memory. I was not aware when I ordered these new products that I would figuratively be throwing my emotional system on a bomb in order to protect my readers. And little thanks I get anyway, right? I should chalk it all up to the rigors of being a pioneer.

If you've managed some way to experience the sudden horror of a blank menu—or worse, a blank screen without even a menu—I'd like to hear from you. Let's have some horror stories. If this came from your being an early user of an add-on product, give me the details. Did you get much (any) help from the manufacturer?

The Model 100 seems to be able to clean the menu under several circumstances. I've had it happen when my battery was weak, though not weak enough to indicate on the low battery light. A printer dump at this time, and suddenly . . . all gone.

I tried an add-on memory unit. Golly that worked great. But after a couple of months its little battery died and so did that half of my memory. This was made worse by the needed batteries being difficult to find—and the replacements, when found, being next to death's door, again losing my second memory bank a few days later.



Another memory unit apparently was unable to co-exist with Lucid. Once you use Lucid you'll have a tough time being without it—it's a great spread sheet program in ROM. But when Lucid and a memory unit battle for the same memory address and kill my pico in the process, I'm mad. Well, I expect to be mad once I come up in tone from total shock at losing an entire week's work on a trip up through apathy to anger.

You know, after that trauma of cold starting my 100 while trying to cope with Compuserve, I haven't yet had the courage to try again. One of these days I'll do it. ◆



## GridCase

(continued from cover)

power, a keyboard port, and optional telephone line and video output jacks. The battery is a Grid power pack containing rechargeable nickel-cadmium batteries.

### The GridCase 2 Measures Up

The LCD screen swings up from the front of the machine, pivoting about the middle of the case to reveal a 57-key keyboard, an unobtrusive low-battery light, a covered compartment that contains sockets for up to 512K of read-only memory (ROM) and a reset switch.

The basic GridCase 2, which comes with a built-in 3½-inch disk drive and 128K of RAM, costs \$3,150. Expanding the memory to 256K costs \$600 (to 512K, \$1,200). It is Grid's policy to send you a loaner machine for use while yours is at the factory for an upgrade.

Grid offers external 5¼-inch and 3½-inch disk drives that connect to the GridCase 2's external bus; each drive costs about \$1,000 (including cable). A 10-MB hard disk drive is also available for about \$2,350.

Inside the GridCase 2, a 300/1,200-baud internal modem is available as well as a color video output. For users who crunch large amounts of data, Grid will install an 8087 coprocessor for about \$200. Each battery pack runs \$60 and should last a couple of years.

The GridCase 2 computer I reviewed featured a built-in 1,200-baud modem, 512K of RAM memory, a color video output, and GridROMs containing MS-DOS 2.11 and GridWrite and GridTerm. Throw in an external 5¼-inch disk drive and cable, and you can figure the hardware in the reviewed system runs just over \$7,000.

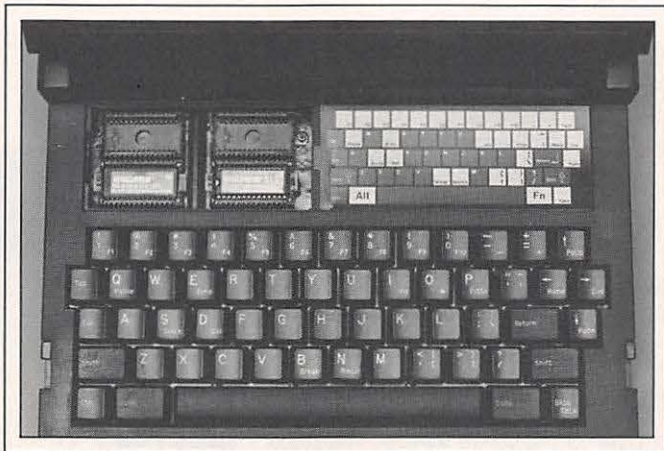
### What's It Like?

The GridCase 2 is no hardware hacker's dream—there are no slots to fill, no switches to flip. The only DIP switches I encountered were on the external 5¼-inch disk drive. There are two of them and their use is fully documented in the manual. About the only time you get a glimpse of the machine's electronics is when you pry off the metal plate covering the ROM sockets to get at the reset switch. The GridCase 2 strives for minimum hassles for the user and largely accomplishes its goal.

Using the Grid is a real joy. My only real concern was how long the battery pack would last since I do a lot of data transfer by phone—the modem and disk drive are a

constant load on the battery. I found, however, that a Grid battery will last six hours under these circumstances. A second backup battery pack would be a good idea.

With the color video output option installed and a monitor attached, I was able to stage computer-aided presentations for small groups of people. By connecting both a keyboard and a monitor to the machine, the GridCase 2 turns into a system unit with one disk drive (plus whatever is on the ex-



Top view of the keyboard. Note the function key chart in the upper right corner.

ternal bus); the LCD screen need never be used, except when the machine is taken on the road.

### Key Impressions

My only major disappointment was the keyboard. Although the Grid keyboard does provide the user with all the functionality of the IBM PC keyboard, getting at some characters requires a three-key combination. Some normally one-stroke operations, such as *Del* and *Ins*, are two-key operations on the GridCase 2.

The misplacement of the CTRL key, which is located in the lower left-hand corner below the Shift key, is a serious flaw, particularly if you use a number of different computers at work. If you anticipate using the Grid as your main machine, this may not bother you—but take it from me, having to relearn where the CTRL key is every time you switch computers is a royal pain in the left little finger.

Another minus is the lack of a numeric keypad. Although Grid makes up for this shortcoming by offering an accessory keypad that plugs into the DIN keyboard port, Murphy's Law says that the time you'll need the keypad most urgently will be the time you leave it in the office.

Of course, lack of a keypad and other quirks can be forgotten instantly by plugging your favorite PC keyboard into the

DIN port in the back of the Grid. Presto! It feels like you're typing on a real PC. The GridCase 2 keyboard can be designated for work on-the-go.

The LCD screen measures about nine by four inches and presents a standard 25-line by 80-column display (640 pixels by 200 pixels) on a background having an amber cast. Using the optional GridMaster software, the type fonts can be set from a minuscule four by seven pixel size to a gargantuan 24 by 32 pixels. The aspect ratio is right on—pie charts look like pie charts and not like egg charts.

I was pleasantly surprised by the contrast and readability of the GridCase 2's screen. It's the best LCD screen I've seen. The contrast is adjustable with a switch on the side of the screen. Grid's engineers did not opt for a screen that has intermediate positions; the screen is designed to open to one position. Of course, the screen is still limited by a narrow field of view, making it impractical to use for any audience of more than two.

### The Owner's Guide

The GridCase Owner's Guide is an 80-page booklet that helps the new user set up the computer and acquaints him with the various parts of the machine. Various chapters cover optional equipment, the care and feeding of the disk drive, connection of devices on the external bus, troubleshooting, and maintenance. Appendices cover testing of the modem and provide DIP switch settings for external devices as well as Epson and Hewlett-Packard printers and the Hayes Smartmodem.

This booklet isn't as slick as some of the other Grid documents, but it does its job. Don't forget to pack this one when leaving for a business trip.

### Software

Grid sells its own version of MS-DOS for the GridCase 2. The Grid version offers some features not available with PC-DOS or other types of MS-DOS.

Among the most important of these features is a MODE command that augments the functionality of the PC-DOS MODE command by allowing the user to control devices unique to the Grid computer. For example, MODE allows power to be switched on and off to the Grid's internal modem and controls the modem's parameters. It allows the display mode to be set for the display and the external monitor.

Other differences are the ability of Grid MS-DOS to read, write, and format 3½-inch diskettes, the availability of an exten-

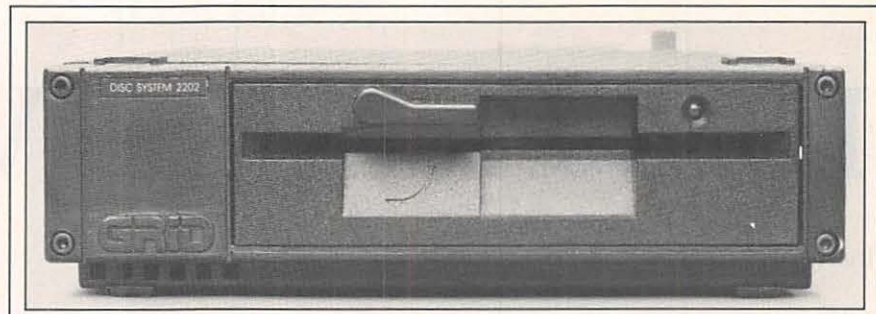


sive HELP utility, and the ability to support programs in ROM (including MS-DOS itself). With MS-DOS in ROM, the user need never worry whether a diskette has a system on it; something I find to be a real convenience.

My test for IBM PC compatibility is pretty simple: Can I take a PC diskette, insert it in the Grid and start to work? Well, nearly every MS-DOS program I could find to run on the GridCase 2 did so without complaint. The list included MS-DOS heavyweights like Lotus 1-2-3 and WordStar, as well as programs like Whitesmiths' C compiler, PC-TALK, and IQLISP.

My only misgivings about IBM compatibility concern the format question: If you don't buy an external 5 1/4-inch disk drive, you won't be able to use any copy-protected IBM software you may own on the larger disk format. Also, getting the software you need on the 3 1/2-inch format may involve licensing hassles and additional outlays for programs you've already paid for.

If you're not particularly enamored of IBM software and are looking for a tightly integrated set of programs to help you man-



The optional external 5 1/4-inch disk drive is designed for stacking with the hard drive, 3 1/2-inch disk drive, and emergency power battery pack (the connector at the back can be flipped up to plug into the next unit above).

related files), the title and kind (analogized as a "first" name and a "last" name), and an optional password before retrieving an application. It's a bit awkward at first, but easy to get used to.

The documentation, appropriately titled "Getting Started," eases the user into using Grid software with analogies to common gadgets like file cabinets and phonograph records. Except for a lack of variety in typestyle to set off important text, it is complete and well-written. The "GridMaster User's Guide" does not share the type style problem, and is a well-written, understandable guide in a professional format.

GridManager is an application that helps the user manage all the other files in the system, and provides sign-on and sign-off

it effectively. I suspect, however, that once mastered, it will play a central role in one's work. If you have not already wedded yourself to a set of MS-DOS programs, I'd say that if you're going to get a Grid computer, by all means take some time to check out the Grid software.

#### Conclusions

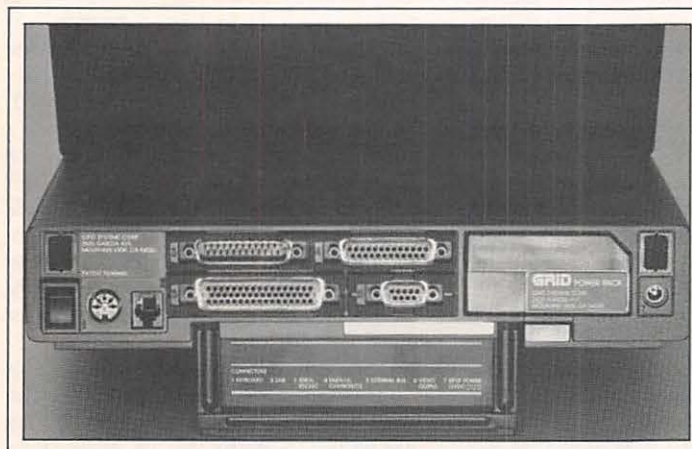
The GridCase 2 offers the user, for whom price is not a crucial consideration, an elegant, powerful machine. It is not intended to be a "second" computer, but rather a portable desktop machine with all major desktop features, suitable for use in the office or on the road. ■

#### Manufacturer's Specifications:

Manufacturer: Grid Systems Corp., 2535 Garcia Ave., Mountain View, CA 94043 (800-222-GRID).

Price: \$3,150 with built-in 3 1/2-inch disk drive of 720K, and 128K of RAM; 80 by 25 LCD; 80C86 microprocessor; serial and parallel port; expansion bus; RJ-11 phone jack; DIN plug; clock/calendar; audio speaker; keyboard; AC power pack.

Options: Internal rechargeable battery pack (\$60); 8087 coprocessor (\$195); RGB internal color video port (\$350); 300/1,200 internal modem (\$795); 128K increment of RAM (\$600); external disk drive (\$1,000); 10-MB hard disk drive (\$2,350); battery pack (\$60); Grid management, application, and communications software; for other available options contact manufacturer.



The connectors at the back of the Grid are all clearly labeled by the flip-down support on the bottom. The pop-out battery is on the right.

age time and projects, you might want to consider using the proprietary Grid Operating System (Grid-OS) in conjunction with GridMaster. This program provides a calendar, reminder list, activity scheduler, file folder, card file, organization chart, calculator, and 10-number phone memory from a main menu—and it lets the user run selected applications from that main menu. Other software available includes GridFile, a database manager; GridPlan, a spreadsheet; GridPlot, a business graphics tool; and GridWrite, a text editor.

From what I could tell, Grid software is menu-driven and revolves around what Grid calls the file form. This form requires the user to supply a device (where the file is stored), the subject (the group name for

procedures for communications with Grid Central (a multipurpose telecommunications service available to Grid owners), file server devices, or other sources.

GridTerm and GridReformat are two programs designed to let owners of Grid microcomputers perform data transfer via telecommunications and to convert received data into a format suitable for other Grid applications. My only complaint with GridTerm is its lack of support for the popular XMODEM file-transfer protocol. The documentation for these programs is also concise, well-written, and has a professional appearance.

From my experience with Grid software, I don't doubt it will take a large investment in time and effort for a user to be able to use

Alex Lane is a control systems engineer with an architect-engineer planner firm. Based in Jacksonville, Fla., he writes articles for Run, Portable Companion, and various other national publications.



# IBM Picks the Winner

by Kevin Strehlo

**Although a million CP/M computers have been sold, several million more run MS-DOS. How did the business of computing arrive at a standard?**

It was a nice piece of business for Seattle Computer. Their project to write an operating system for the 8086 processor was under way anyway—they needed it for their own hardware. So getting some upfront money to finish the software, plus \$10,000 for each customer Microsoft licensed it to, seemed like a great deal to Seattle Computer president Rob Brock.

Brock had his first glimmer of doubt about the wisdom of the deal one day late in 1980 when someone called Seattle Computer with a question.

"I'm with IBM," the voice said. "I want to know something about the operating system you're doing for us."

"You're with WHO?" Brock asked, his voice rising incredulously. The man on the other end of the receiver said "oops" and hung up.

When Brock mentioned the call to his employee Tim Paterson, who was writing the software to the specifications of Microsoft's customer, the two laughed about it and wondered if that customer might really be Big Blue. It seemed odd and, even if the customer was IBM, not necessarily significant. The chance that IBM would be able to make much of a dent in the wide open world of microcomputers—far from the tightly controlled, large sale environment of IBM—seemed pretty small. No one company dominated the personal computer business, and it seemed unlikely that IBM would be more than just another player in a crowded field.

## Who's the Boss?

The one thing that did dominate personal computing was the CP/M operating system. Nearly every microcomputer used it—even the Apple II, although it required an add-on board with a processor that ran the 8080 instruction set. It seemed unreasonable that even IBM would switch from an industry standard as strong as CP/M.

It was only when Paterson went to work

for Microsoft a few months later that he learned it was IBM. But even at the introduction of the IBM PC in August 1981, it wasn't clear that the MS-DOS operating system Tim Paterson had written, dubbed PC-DOS by the press—although IBM called it simply DOS—would be important.

IBM introduced the PC with three operating systems—PC-DOS, the p-system and CP/M 86. Even the market research firm, Future Computing, wrote that the most significant aspect of the new machine was that the PC ran CP/M.

But CP/M was not to dominate the personal computing world any longer, and Future Computing quickly changed its tune. Later reports by the Texas-based market research firm rated a new computer largely on a single factor: whether it could run off-the-shelf PC-DOS applications.

Today, while laptop computers remain a stronghold for CP/M, the majority of the action in software development and microcomputer sales has been with MS/PC-DOS machines.

How did it happen? Why did CP/M lose out to MS-DOS? Why is CP/M still important in the world of picocomputers? And what's the difference anyway? Is MS-DOS any better than CP/M?

The best way to answer these questions is to go back to the beginning.

## The Birth of CP/M

In 1972, while Gary Kildall was teaching computer science at the U.S. Naval Postgraduate School in Monterey, Calif., he became intrigued with one of the first of a new type of semiconductor part called a microprocessor. Although the four-bit Intel 4004 was too limited to do anything useful, Kildall's curiosity was piqued by the idea of a computer on a chip, and he decided to visit the Silicon Valley company that was making the things and see what else Intel had cooking.

Kildall and the small group of engineers

working on microprocessors at Intel hit it off, and soon Kildall found himself commuting inland from his ocean-side home one day a week to work at Intel. Using a minicomputer to simulate Intel's new eight-bit microprocessor, the 8008, Kildall soon had created a version of the PL-1 language that ran on it.

Kildall took one of the systems Intel sold as an aid in developing software for the new microprocessors as partial payment for his work. Although his students at the Institute loved to play with the 8008-based microcomputer (which was soon upgraded with the more powerful 8080 and a high-speed tape reader), Kildall knew it needed real data storage if it was going to be truly useful. He did some work for Shugart Associates in 1972 in exchange for one of the early eight-inch floppy disk drives. But Kildall, no hardware expert, failed in designing a controller board to interface the drive with his computer.

It was not until 1973, with John Torode from the University of Washington designing the hardware, that Kildall was able to write a simple operating system to control the transfer of data between the computer and the disk drive.

Despite the acronym DOS, which stands for Disk Operating System, there is more to such software than the kernel that Kildall had written to control the disk drive. However, Kildall wasn't focusing his attention on fleshing out his operating system kernel. The project he had great hopes for was a microprocessor-based horoscope machine that he and a friend built and installed in stores all around San Francisco. Although the work didn't pay off in the anticipated deluge of quarters—the mechanical part of the machine tended to jam after it had printed just a few horoscopes—it rounded out Kildall's kernel.

When he tackled the software development tools (an editor, assembler and debugger that aided the production of language the microprocessor understood) he had used to develop the horoscope program onto his kernel, Kildall had all the tools needed to write and run useful programs.

When Kildall showed his Control Program/Monitor (CP/M for short) to the powers that were at Intel, they said it had no



commercial potential. The company thought its microprocessors would end up largely in watches, calculators and appliances, not in the kind of general-purpose microcomputers hobbyists were building.

so CP/M and the Z80 microprocessor on which it ran became a kind of standard by default.

Not all computer manufacturers offered CP/M. Radio Shack substituted its propri-

etary microcomputer business as rumored, Microsoft should do anything it could to be a part of it—because IBM succeeded at nearly everything it tried.

Microsoft's BASIC interpreter had been an integral part of nearly every personal computer sold, and Microsoft's other languages were popular among software developers. Microsoft president Bill Gates knew microcomputers and the personal computer market as well as anyone. Thus it was no surprise when IBM asked Microsoft to make a proposal about developing languages for its planned machine and detail what the features of that machine should be.

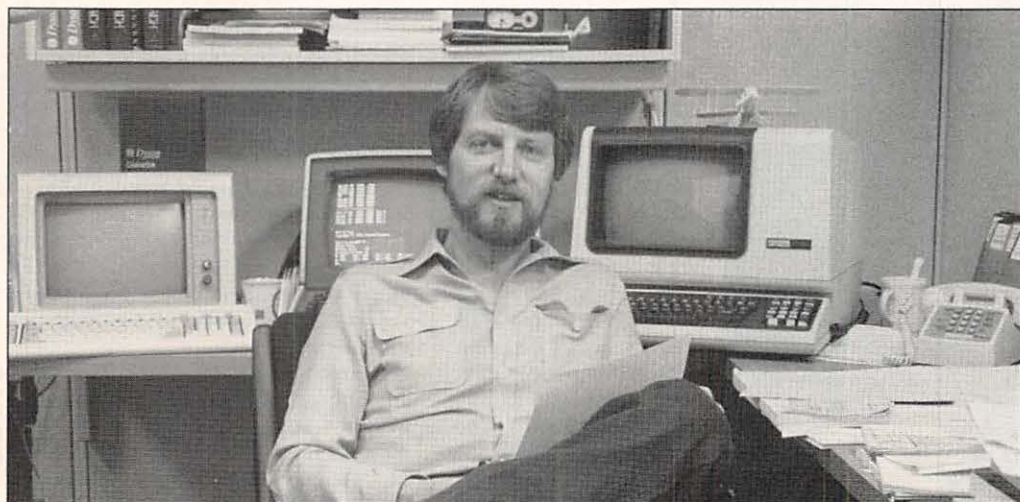
No, it was no surprise that the computing industry veterans listened to president Bill Gates extol the new generation of 16-bit chips and the need for a disk drive—they were thinking of an 8-bit machine with a cassette inter-

face. But it was a bit of a surprise when an IBM official responded by asking Gates to sell IBM CP/M as well. Gates patiently explained that CP/M belonged to a company 1,000 miles down the coast, DRI, headed by Gary Kildall. Gates dialed DRI's number and handed the phone to an IBM representative, who made an appointment for the next day.

Legend has it that Kildall was out on a joyride in his plane when IBM came calling. Actually, Kildall already had an appointment with a customer in Silicon Valley the next day and, unlike Gates, decided to keep it. After all, Dorothy McEwan always handled the business end of things with the firm's legal counsel anyway—why should a meeting with IBM be any different?

After concluding his business, Kildall flew back in the late afternoon and joined the meeting in progress, but things weren't going well. McEwan and DRI's legal counsel Jerry Davis had balked at the nondisclosure agreement IBM had asked them to sign, because it contained a clause that specified any information revealed in the meeting would become IBM's to use as it pleased. Since the meeting was about CP/M, McEwan thought such an agreement amounted to giving away the store, and refused to sign. The IBM representatives were on the verge of leaving when Kildall arrived.

Kildall, familiar with IBM's way of doing things, knew IBM was an honorable company. The nondisclosure document was meant to protect IBM from lawsuits in the event it later marketed similar technology



Gary Kildall, operating system pioneer, took his Control Program/Monitor and formed Digital Research, Inc.

Thus it was that Kildall, encouraged by his wife Dorothy, formed a company called Intergalactic Digital Research, placed ads in a few magazines and began to sell his CP/M. As the business became more serious, the Kildalls incorporated as Digital Research, Inc. (DRI). Dorothy, to avoid any "just his wife" stigma, began using her maiden name, McEwan. When they sold Im-sai unlimited rights to CP/M for \$25,000 in 1977, Digital Research became a full-time enterprise with Gary running research and development and Dorothy handling the business side.

When the ability to utilize a disk drive and its Z80 microprocessor (which was faster than the 8080 but ran the same instruction set) gave Im-sai an edge over its chief competition, MITS (maker of the first commercially successful personal computer, the Altair), other emerging microcomputer companies began to make the trek to Digital Research in Pacific Grove, a suburb of Monterey.

Tarbell Electronics, Digital Microsystems, Heath Electronics and the dozens of other companies that licensed the CP/M operating system had good reasons for the trip. It was cheaper to license the operating system Kildall had developed and tailor it to a particular Z80-based microcomputer than it was to develop an operating system from scratch. More important, a machine on which CP/M ran could run the application programs that had been written for other CP/M machines. The only operating systems in competition with CP/M were limited to a single manufacturer's machine, and

etary TRS-DOS for the Z80-based TRS-80 computers, for example. But many TRS-80 users bought a version of CP/M tailored for the Radio Shack machines by other companies, such as Pickles and Trout, in order to run all the CP/M software.

The most popular personal computer in 1980 was unquestionably the Apple II, which couldn't run CP/M because it was based on the 6502 instead of the 8080 or Z80. Although much credit for the success of Apple's machine has to be given to the first spreadsheet, VisiCalc (which at first ran only on the Apple II under Apple's proprietary DOS), many Apple II owners bought an add-on card for their machines that included a Z-80 processor, memory and the CP/M operating system. This allowed them to run the ever-increasing pool of business software being written for DRI's operating system, including Wordstar and dBASE II.

The most popular of such cards was the Softcard, developed and sold by Microsoft. In fact, sales of the Softcard were so high that Microsoft became DRI's largest customer for CP/M. As 1980 rolled to an end, that fact was soon to take on an ironic twist.

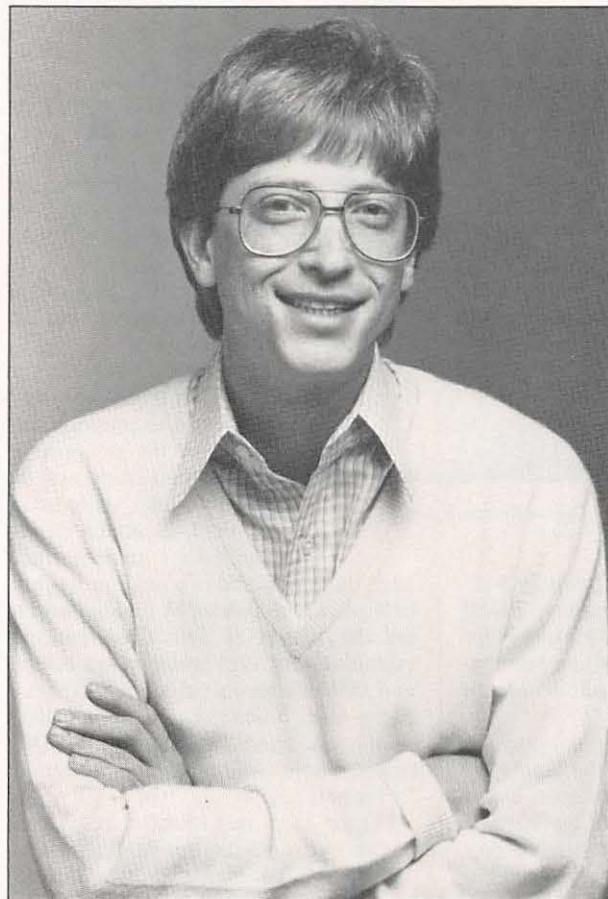
#### CP/M Upgraded

When IBM decided to enter the microcomputer business, it went to Microsoft—on one-day's notice—for advice on what kind of machine to build and for several key pieces of software. Gates had to cancel an appointment with Atari's chairman Ray Kassir in order to meet with IBM, but he did it on the theory that if IBM was entering



that had been developed independently within IBM. With Kildall's reassurances, the nondisclosure agreement was signed, the meeting proceeded and, according to Kildall, went rather well.

Gary and Dorothy, as it happened, were



*Bill Gates, chairman of Microsoft, negotiated rights to Seattle Computer's 8086 DOS for IBM.*

about to leave on vacation and had seats on the flight that took the IBM representatives back to Boca Raton, Fla. Discussion continued amiably during the flight, according to Gary, and they agreed to get back together after the Kildalls returned from vacation.

It never happened. Bill Gates has said the problem was Kildall's expression of reluctance to modify CP/M for IBM's requirements; Kildall believed a standard was a standard. In any case, IBM eventually came back to Microsoft and asked if the Bellevue, Wash., firm could do an operating system, as well as the languages. It added only another 10 percent or so to the amount of code Microsoft was to write for the new machine; more important, Microsoft knew the operating system under development at Seattle Computer nearly fit the bill. When Microsoft had described that operating system in writing and IBM agreed it would be

fine, provided a few changes were made, Microsoft negotiated rights to Seattle Computer's 8086 DOS.

What Microsoft had really contracted for was the work of a person it knew quite well. Seattle Computer's Tim Paterson had taken the first couple of cracks at designing Microsoft's Z80 Softcard card for the Apple before another engineer finished up. Microsoft was also familiar with Paterson's latest product, a processor board for scientific and engineering computers based on the new 16-bit 8086 chip from Intel: Microsoft had used the board while writing its new BASIC for the 8086 and its compatible cousin, the 8088. The board was one of the first implementations of Intel's new chip. It was done so early that the documentation from which Paterson began designing in June was dated July, and talked about five and eight MHz chips when only four MHz chips were available.

The operating system Paterson was writing for his new board was to be CP/M compatible so that CP/M programs for the eight-bit Z80 could simply be translated and run unchanged on the new 16-bit 8086. Paterson had no access to CP/M other than its documentation, however, and used as his chief

model the CP/M look-alike operating system called CDOS that ran on the Cromenco machine they used at Seattle Computing.

Thus it was that some of the improvements of Paterson's DOS over CP/M were accidental. If CP/M encountered an open disk drive door when it was trying to read from a disk, for example, it would crash. Paterson's operating system, like the CP/M look-alike he used as a model, responded to an open door with an "Abort, retry or ignore?" message.

Some improvements were Paterson's idea, however. You could halt a program that was running under CP/M (and CDOS) only by rebooting the machine. Paterson decided the ability to "break" the operation of a program and return to the operating system prompt made more sense. He also thought that the need for the PIP utility program to be on the disk when you wanted

to copy a file made no sense; nor did the terms PIP and "=" to describe the action of copying a file. Thus he decided to embed a file copying command with more sensible syntax right into his operating system. And whereas CP/M could destroy files if a user switched disks without telling CP/M such a switch had been made, Paterson made MS-DOS look at the disk in the drive before it wrote to it to prevent such disasters.

Perhaps the key thing Paterson tried to do was to speed up read and write operations. Borrowing from the compiled BASIC, he had helped Microsoft put on his 8086 board, he made his operating system keep information about files—called FATs (File Attribute Tables)—in memory instead of on the disk, which speeded file operations considerably.

It turned out that Paterson's DOS was not perfectly compatible with CP/M, however, because—at least according to Paterson—some of the features he copied from CP/M's documentation did not work exactly as documented.

The key difference between the operating systems, however, was due to differences between the chips for which they were written. The Z80 processor that CP/M was designed for could address only 64K bytes of memory, while the 8088 and 8086 processors Paterson wrote his DOS for could address one Megabyte (1,000K bytes) of memory. IBM, through Microsoft, told Paterson to use only 640K bytes of that memory and reserve the remaining 360K bytes for the system's use. Even so, it was hard to imagine that programmers would ever need more than a 10-fold increase in memory. It augured much-improved programs for the next generation of personal computers.

This key improvement of Paterson's DOS over CP/M was also a feature of Digital Research's CP/M-86, of course, since it also ran on the more advanced chips. So why did MS-DOS win?

### **IBM Picks the Winner**

CP/M-86 was only a plan on a blackboard on that fateful day in 1980 when IBM called on DRI. Unfortunately, IBM never called back, and Kildall was unaware of the project's process until, shortly before the IBM PC was to be introduced in August of 1981, IBM returned and asked him to write an operating system for its new machine. Since demand for the Z80-based CP/M had not abated, not much work had been done yet on CP/M for the 8086; a team immediately got to work.

In retrospect, it is clear IBM wanted CP/M only as a backup in case its new operating system did not gain support among third party developers. IBM had clearly stacked the cards in its DOS's favor. The price of PC-DOS was \$40 compared to



\$250 for CP/M-86. Moreover, DRI was unable to ship CP/M-86 for a full year after the PC's introduction, whereas PC-DOS was not only ready on the day of introduction, the programs IBM sold for the machine ran on it. CP/M-86 never overcame DOS's headstart.

As it turned out, the need for MS-DOS to have CP/M compatibility was not significant. Rather than translate old programs that ran in 64K, most developers wrote new software that took advantage of the increased addressing space of the new IBM machine's operating system. Without it, the power and ease of use of such programs as Lotus 1-2-3, dBASE III and MultiMate would not have been possible. Without that extra addressing space, the IBM PC could not have been the overwhelming success it was.

### The Best OS for Picos

For pico machines, however, such power is not always necessary. If a machine's intended tasks are note taking, simple communication via modem, limited number crunching and simple custom applications, the extra expense of more memory and a more powerful processor may not be justified. For many laptop machines, CP/M and a Z80 is just the ticket.

On the other hand, if compatibility with all the software one uses in the personal computer back at the office is called for, MS-DOS and the 8088 is the operating system of choice.

MS-DOS has continued to improve, but many of the improvements are of limited value for today's picos. Versions 2.0 and higher of MS-DOS incorporate a hierarchical file structure that facilitates keeping things straight on a large capacity disk, a need that's less than dire on today's laptop machines, since the power draw and bulk of large capacity hard disks is currently more than can be handled.

Yet, there can be no doubt that MS-DOS has eclipsed CP/M. Although a million CP/M computers have been sold, several million more run MS-DOS. In the world of operating-system specific magazines, it is *CP/M Users Guide* versus *PC*, *PC World*, *PC Tech Journal*, and *PC Week*. In the world of software publishing, the odds are even higher in favor of MS-DOS. And if you need further proof, look no further than to Digital Research's latest operating system, Concurrent DOS: it is MS-DOS compatible. The tables have been turned. ■

*Kevin Strehlo is the former coordinator of PC Week's Rumor Central. He is currently a freelance writer specializing in IBM PC-related topics.*

# International Electricity

by Clifford Roth

Here's a must for the picoist traveling around the world: An international voltage chart. Most countries have 50-cycle AC, whereas the U.S. has 60-cycle. This difference is usually inconsequential, but if you want to be absolutely sure it won't matter, get an adaptor whose maximum current rating (number of amps) is at least 20 percent higher than what's listed on the original adaptor.

COUNTRY	VOLTAGE (AC)
<b>AFRICA</b>	
Gabon	220/380v 50-cycle
Nigeria	220/400v 50-cycle
South Africa	250v 50-cycle
Sudan	220v 60-cycle
<b>ASIA</b>	
Australia	240v, 50-cycle
China	220v, 50-cycle
Hong Kong	200v, 50-cycle
India	220v, 50-cycle
Indonesia	110v, 50-cycle
Japan	100v, 50-cycle
Philippines	110/220v, 60-cycle
Singapore	240v, 50-cycle
South Korea	220v, 60-cycle
Taiwan	110v, 60-cycle
<b>EUROPE</b>	
Austria	220v, 50-cycle
Belgium	220v, 50-cycle
France	220v, 50-cycle
West Germany	220v, 50-cycle
Great Britain	240v, 50-cycle
Greece	220v, 50 cycle (110v DC on some islands)
Italy	*115v, 127v, or 220v, 50-cycle
Netherlands	220/380v, 50-cycle
Norway	220v, 50-cycle
Poland	220v, 50-cycle
Soviet Union	127/220v, 50-cycle
Spain	125v, 50-cycle
Sweden	220/380v, 50-cycle
Switzerland	220v, 50-cycle
<b>MIDEAST</b>	
Algeria	*127/220v or 220 380v, 50-cycle
Egypt	220v, 50-cycle
Iran	220v, 50-cycle
Iraq	220/380v, 50-cycle
Kuwait	200-240v, 50-cycle
Saudi Arabia	220/380v, 60-cycle
<b>WESTERN HEMISPHERE</b>	
Argentina	220v, 50-cycle
Brazil	*110v or 220v, 60 cycle
Canada	110v, 60-cycle
Chile	220v, 50-cycle
Colombia	*100, 110, or 150v, 60-cycle
Equador	100v, 60-cycle
Mexico	110v, 60-cycle
Peru	220v, 60-cycle
Venezuela	110v, 60-cycle

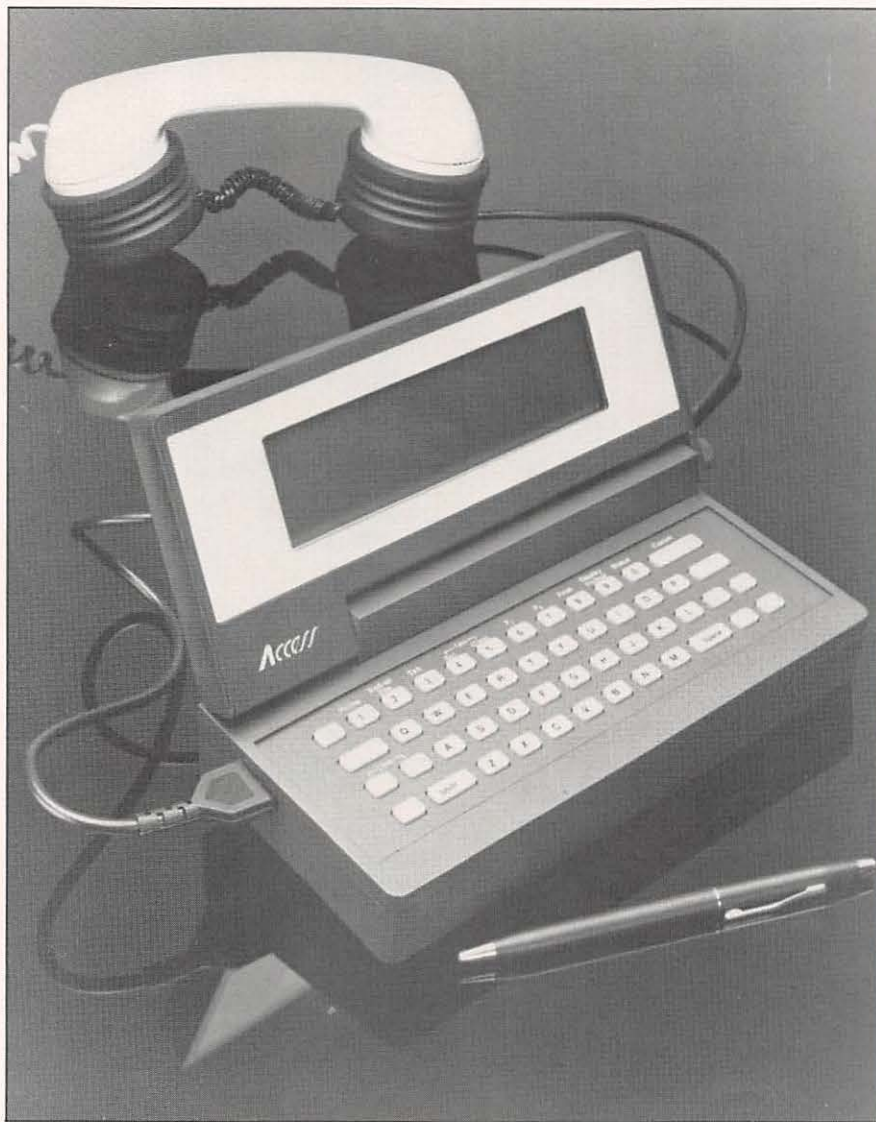
(\* varies from city to city)



# ACCESS: The Tom Thumb Of Picos

by Jason Rich

**Access, a petite customized pico, is tailored to fit your needs and practically your pocket.**



Melard Technologies has recognized the inconveniences of telecommunications on the go—and has come to the rescue with Access. Manufactured entirely from “off the shelf parts” for ease in customization, the Access has the power of portable computers packed into an almost pocket-sized unit.

For computing power and memory the Access uses an eight-bit CMOS microprocessor. The unit weighs just 24 ounces and measures 8 1/4 by 3 3/4 by 1 3/4 inches. Its flip-up 8 line by 40 character LCD display (equaling that of the TRS-80 Model 100) is manufactured by Epson and is compact yet easily readable in most lighting situations.

Access is powered by the Polaroid #P500 lithium power pack which is thin, lightweight and can be purchased in most hardware or camera stores. Using this power pack, the unit is supplied for up to 12 hours of continuous operation. A rechargeable battery pack is now under development by Melard for availability in the near future.

### A Pocket- or a Picocomputer

Because Access is a cross between a pocket computer and a portable notebook computer, the size of the keyboard is small. Touch typing, and consequently word processing, on the 49 soft-touch silicon rubber keys is difficult. Long memos and letters can take some time to type—but entry of a short telex to be sent from a pay phone via MCI Mail is a speedy process.

Melard Technologies sees the Access as a computer “designed to be redesigned.” Therefore, plans to sell the unit on the end-user retail market are limited. The unit is geared to big volume corporate buyers and Value Added Resellers who will use the unit for specialized applications designed in an assortment of programming languages, including C and assembler language. A special package called ADAS allows applications to be designed on the IBM PC and transferred permanently to the Access unit.



## *“The Access was designed for telecommuting.”*

Some “generic” applications which can be used in conjunction with customized applications are a telecommunications program, a text editor and address book, scheduler, alarm clock and calculator application.

According to a Melard representative, specialized applications are now being developed to include applications for electronic banking and for data/order entry and retrieval in such fields as medicine, insurance, real estate and finance. Also in the works are special programs for connecting the Access to host computers and major on-line information services, such as Dow Jones News Retrieval and MCI Mail.

### **The Raison d’Etre**

Each of these applications involves telecommunications—the Access was designed for telecommuting. Telecommunications with Access is fast and easy. To connect to a host computer, the acoustic cups merely need to be connected to the side of the Access, the unit turned on, and the telecommunications application selected. A standard telephone is required. At the present time, the Access has a built-in 300 baud modem which does not have auto dial or auto answer features. Future enhancements and options will include a direct connect 1,200 baud modem and an RS-232 cable for connecting Access to a desktop computer via a direct connect cable. A cable for connecting the Access to a printer and other peripherals including VAR code readers will be introduced in the future by Melard.

The \$499 to \$995 unit price is dependent upon the number of units purchased, and the type of Access unit required for the application(s) required.

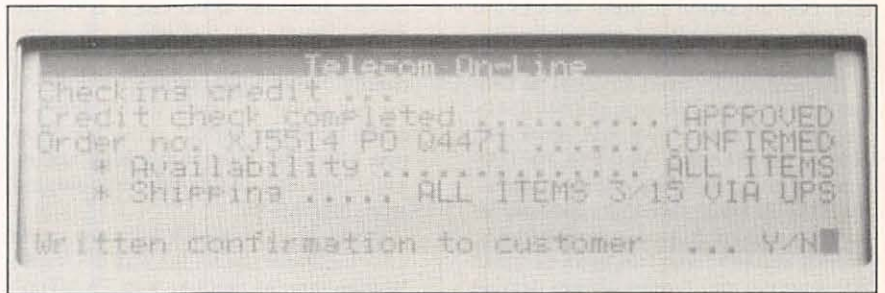
Access is a well-built, pocket-like portable with much potential. User-friendly, menu-driven software is being developed to eliminate the problem of the small keyboard and limited text editing capabilities. Because the unit is excellent for receiving electronic mail and telexes—it requires no computer knowledge to operate once the customized software has

been developed—business managers, sales representatives, and people who work “out in the field” will find many uses for this computer.

Melard Technologies is prepared to provide its clients with technical support and will modify the computer’s

hardware and software for specific applications. ■

*Jason Rich, president of Software Riches, a portable computer software development firm, is the associate producer of The Computer Connection, an AP national radio program.*



*A flip-up eight-line by 40-character LCD display and a keyboard of 49 keys accommodate compact word processing.*



*To connect ACCESS to a host computer, the acoustic cups are connected to the side of the little unit and the telecommunications application is selected for 300 baud transmission.*

### **Manufacturer's Specifications**

**Manufacturer:** Melard Technologies Inc., Five Westchester Plaza Elmsford, New York 10523 (914-592-3044).

**Price/Options:** Three end-user Access units range in price from \$775 to \$900. The price includes the Access unit plus the acoustic cups, software (in ROM), AC adapter, carrying case, and manual. The Access units are available only from

a limited number of specialized computer dealers such as regional MCI Mail representatives.

The following lists RAM/ROM memory combinations: The \$775 unit offers 48K on board and 16K RAM cartridge; the \$825 unit offers 56K memory on board and a 32K RAM cartridge; the \$900 unit offers a 56K memory on board and a 64K RAM cartridge. These end user models contain all of the “generic” Access software already described.



# Leavin' On A Jet Plane

by Elizabeth M. Ferrarini

**H**ong Kong. Newark. Whether you're traveling for business or pleasure, there are several electronic services that can help you save time and money before you take off.

The most popular travel service is the Official Airline Guides—Electronic Edition (OAG-EE) (200 Clearwater Drive, Oak Brook, Ill., 60521, 312-654-6247). Based on the OAG North American and Worldwide paper edition, the OAG-EE features schedules and fares for about 1.5 million direct and connecting (that is, stopping at a city en route) flights for more than 700 domestic and foreign airlines serving 105,000 pairs of cities. All of this information is updated and accessible 24 hours a day.

Using the OAG-EE is easy once you've learned the commands, such as /F for fares and /S for schedules. The service does have a reference card that you might want to pack with your pico.

This service, which is available directly through GTE Telenet, charges a one-time \$50 fee and 10 cents per minute of connect time for either baud rate any time of day. In addition to these charges, you pay 30 cents for each chunk

of flight schedule and 20 cents for each fare you display. You can also access the OAG-EE through third-party services such as CompuServe, The Source, and others. However, you'll save money by accessing the OAG-EE directly. The third-party services waive the \$50 fee, but charge an hourly fee of about \$30 during prime time and \$21 during non prime time. Of course, if you're in a hurry and use any of these services, then spend the money and access the OAG-EE.

Eventually, the OAG-EE will allow you to make flight reservations. But until this feature happens, you can check in with TWA-Travelshopper on CompuServe. This database also has up-to-the-minute flight schedules and fares for almost every airline in the world. Travelshopper goes one step further by allowing you to make and change confirmed reservations 24 hours a day. Travelshopper will forward your reservation requests to any of the more than 4,000 travel agents using TWA's PARS reservation and ticketing system. You can specify where you want to pick up the tickets. CompuServe levies a slight surcharge for this database.

Besides Travelshopper, CompuServe has other travel databases such as Worldwide Exchange, listings of vacation homes and yachts for rent; A-Z Travel Databases, listings of hotel rooms; and Department of State's Travel Advisory Service, political and economic low-downs about foreign countries. None of these databases has a surcharge.

Before booking passage on the Love Boat, consult Laxessa International's CompuTrav, an electronic directory of cruises and tours at below basement prices. Laxessa (622 Broadway, New York, N.Y., 10012, 212-759-8555) gets its information from travel clearing houses offering last-minute vacancies at lower-than-low cost. The easy-to-use-service has a one-time \$30 fee and a \$1 monthly minimum. You pay 20 cents per minute of connect time for either baud rate any time of day. This service doesn't use a network.◆

*Elizabeth Ferrarini is the author of the book Confessions of an Infomaniac and Infomania: The Guide to Essential Electronic Services.*

## Word Finder by Terry Kepner

**W**ord Finder, an electronic thesaurus, is a dynamite accessory for anyone who uses a word processor on a regular basis. It's a simple and elegant tool for writers that will pay for itself in a remarkably short time. Its use is effortless—just press two keys and wait for the result.

Word Finder is a 90,000 word (9,000 key words) electronic thesaurus that integrates itself into your word processor so that you can easily and quickly find alternatives to words that aren't quite right for what you want to say. Word Finder is compatible with these popular word processors: Wordstar, Wordstar 2000, Multimate, Word Perfect, IBM Writing Assistant, PFS:Write, Microsoft Word, and Easy Writer II, with many other versions under development. And it is available for both CP/M and MSDOS operating systems. The program takes up 25K on your disk and the word file takes only 156K.

### Getting Started

There are two easy methods of installing Word Finder on your computer system: You can run the installation program included on the disk, or you can describe your system to Writing Consultants when you order the product. They will do all the preliminary work. With this last option, you just copy the Word Finder program to your word processor disk and start working. When you want to use the word processor, just type SF at your DOS prompt.

With MSDOS machines such as the Data General One, Word Finder displays the word closest in spelling to the one you want to replace, as well as the fifteen words before and fourteen words after it in alphabetical order. Thus you can check to see if you misspelled the word or if one similar in meaning is nearby. CP/M versions of Word Finder do not support this feature. This feature lets you see if you inadvertently chose

a plural form of a word in the key list (i.e., detects instead of detect).

### The Found Word

When the word is found, it is displayed in the Word Finder box with a word form descriptor and a list of synonyms. If the word has several forms (adjective, adverb, verb, etc.) the proper descriptor is displayed at the head of each list of synonyms. For example, the word *short* can be used as an adjective, verb, or adverb. Word Finder displays all the synonyms of short as an adjective, followed by all the synonyms of it as a verb, and finally the synonyms of it as an adverb.

When you find the replacement word you want, place the cursor on it using the directional keys and press the RETURN key. Word Finder takes the word and automatically places it in the proper position in your document. If you don't find a word to your liking, just press the escape key to return to your word processor.

And that's all there is to the program's use: Put the cursor on the word to be replaced, call Word Finder by pressing the proper two keys, select the replacement word with the directional keys, and press RETURN.

The Word Finder's documentation is barely eleven pages long, which is all that is needed for this simple program. Interesting is Word Finder's unusual method of copy protection: Your name and address are incorporated as an integral part of the program. Every time you run the program, your name, address, and registration number are displayed. Giving away copies of the program will void the registration number—and cut the user off from future support, should it be needed—plus spread the user's name and address around the computer hacker community.

Word Finder is a fast and simple utility for writers that eliminates the need for thick books to find the right word.

Word Finder, Writing Consultants, 300 Main St., East Rochester, NY 14445, 716-377-0130, \$79.95.



# When Killer Strikes, Picos Need Security

Richard Ramella

**B**ack in the office after lunch, I found this message on my pico: Killer was here—?SN Error. Security had been breached. When important programs and text files are in a computer, curious or malicious button pushers can be dangerous. So, the next day I put in this Basic listing, typed RUN, pressed enter and went for a hamburger:

```
100 CLS: PRINT "Please don't touch key-  
board."
```

```
110 X$=INKEY$:IF X$="" THEN 110  
120 CLS: PRINT "Your photo has just been  
taken."
```

```
130 SOUND RND (1)*10000,1:GOTO 130
```

I returned to hear pico tones. Killer had struck but been frightened off. I wished.

The same program the next day got this response: I'm learning. Killer. The flimsy security program was erased. There was no ?SN error, so killer had learned how to print.

## What to Do Next

The best answer was to lock up the pico when absent. But that would have passed up a chance to test some security ideas in what became an interesting game for me and Killer. I wrote the following listing in Basic:

```
100 Print "Can you erase this?"
```

I saved it in an unusual way. In Basic mode, I typed A\$ = CHR\$(8) = ".BA" and pressed enter. Then I typed SAVE "RAM:" + A\$ and pressed enter again. On the menu was a new Basic program listed only as .BA. I discovered I couldn't erase it except by cold-starting the computer and wiping out all memory.

Next, I opened a text file by naming it TEST, and again asked the mystery intruder to try to destroy the file. The quote mark at the end of the file name stymied Killer. The normal text file kill command won't work—KILL "TEST" .DO"—because you can't type a quote within a quote in Basic. Since I was still a bit more sophisticated than my adversary, I could kill the text file by typing KILL "TEST" = CHR\$(34) + ".DO".

CHR\$(34) is ASCII for the double quote mark.

Now Killer couldn't destroy Basic or text files wholesale, but could still get into, read and change them. My next step was a brief Basic listing which encodes and decodes text files. It's Listing 1 with this article. To run it, answer the file name prompt with the name of a text file in memory. Type it in capital letters without the .DO extension and press enter. Type C to encode or D to decode. It works at about 33 characters a second, POKEing the new characters over the old in the text file.

A caution: Plain text must be made of only the characters apparent on your keyboard. If you get an FC error message, you've tried either to code or decode material already in the requested state. No harm is done; the program just ends.

Killer could now change, but not understand sensitive text files. This still wasn't enough. So I tried one last ploy. It's Listing 2, Hider. Be careful when you choose to run it. It will erase the name of every text and Basic file from the menu. You can still maneuver the menu cursor over the invisible files and get into them. But in the menu mode they appear empty. And you can't change them back. You can go into a file and save it to tape, giving it a file name as you do so.

I put a smug challenge to Killer on the screen and left the office for an hour. When I got back I found the computer was empty of memory. Killer had learned how to shut down and cold-start the system.

That was game's end. The next time I left my office, I unhooked the pico and hid it. In its place I left a note: Killer, you win!

## A Valuable Lesson

The lesson I learned was valuable. There are all sorts of tricks to be played to thwart casual snoops. However, a pico is an open channel and determined people don't stay ignorant long. You can encrypt, protect and obscure in many useful ways, but the best method is one available only with a true pico. It's small enough to be easily locked in a desk drawer.

## Listing 1 with Killer: CODER

```
100 REM * Coder  
110 MAXFILES=1: CLS: CLEAR 250:  
DEFSTR A-G:X=63919  
120 INPUT "Name of text file";F  
130 INPUT "<C> ODE OR <D>  
ECODE";C  
140 IF C="C" OR C="c" THEN L=100  
ELSE L=-100  
150 IF INSTR("CcDd",C)=0 THEN CLS:  
GOTO130  
160 X=X+1: IF PEEK(X)=0 THEN 160  
ELSE IF X>64128 THEN PRINT "No  
such test file in system.": END  
170 IF PEEK(X)>192 THEN 160  
180 K1=PEEK(X+1)=PEEK(X+2)  
*256  
190 FOR R=X TO X+10:D=  
D+CHR$(PEEK(R)):NEXT R: PRINT  
200 IF INSTR(D,F)=0 THEN 160  
210 OPEN "RAM:" + F + ".DO" FOR  
INPUT AS 1: CLS: PRINT "Working"  
220 IF EOF(1) THEN 240 ELSE  
B=INPUT$(1,1)  
230 POKE K1+Q1,ASC(B)+L:  
Q1=Q1+1: GOTO 220  
240 CLS: BEEP: PRINT "See new version":  
END
```

## Listing 2 with Killer: HIDER

```
100 REM* HIDER  
110 CLS: CLEAR 250. DEFSTR A-G:  
X=63919  
120 HS="-." + STRING$(5,32)  
130 X=X+1: IF PEEK(X)=0 THEN 130  
140 IF X>64128 THEN PRINT "work  
done.": END  
150 IF PEEK(X)>192 AND  
PEEK(X)<>128 THEN 130  
160 K1=PEEK(X+1)+PEEK(X+2)*256  
170 IF K1<32000 THEN 130  
180 V=0: FOR Q=X+3 TO X+10:  
V=V+1  
190 POKE Q,ASC(MID$(HS,V,1))  
200 NEXT: GOTO 130:END
```

*Richard Ramella is the author of two books and numerous articles on computers. His columns and programs have appeared in various publications.*



# This May Be Your Gold Mine

by Mark Robinson

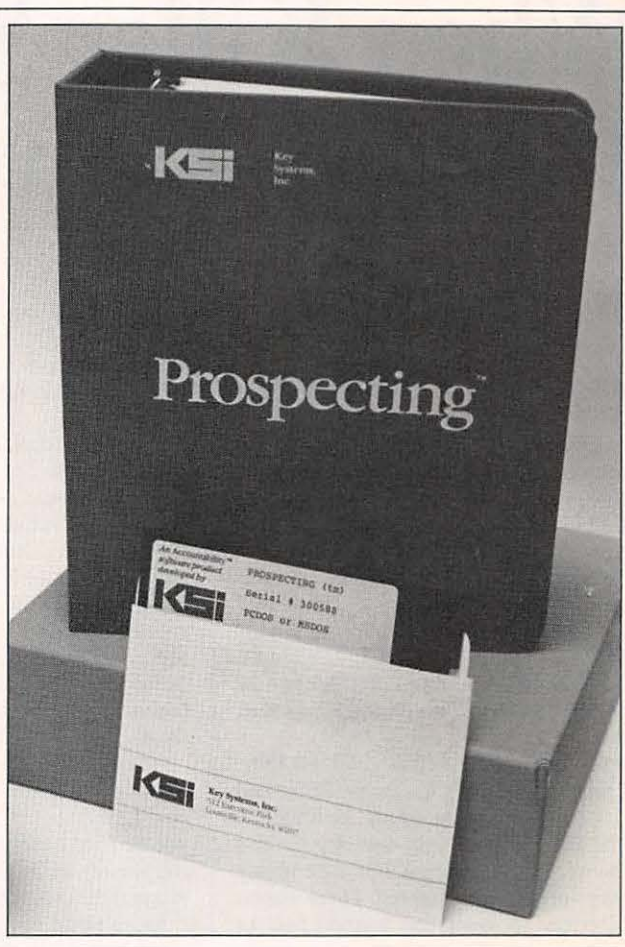
*Customize your customer data base, generate analytical reports, and provide excellent customer service with the powerful PROSPECTING software.*

The telephone company often deserves complaints, but they do deserve credit for efficiency with customer data. Have you noticed that—when you give the sales department your phone number—they know, almost immediately, who you are, where you live, and what kind of telephone system you have? This high level of organization can be a part of any business with a marketing management system called Prospecting. With the instant access to customer files that Prospecting provides, departments of sales, marketing, and advertising can offer an unprecedented level of customer service. Once Prospecting is configured to the computer, customized to the business, and filled with customer information, it offers precise data, customized reports, and in-depth analysis.

Prospecting can be configured to most popular computers and terminals. It operates with 128K of memory under PC-DOS, MS-DOS, CP/M, MP/M, or XENIX operating systems, on diskette or hard-disk, in multi-user or stand-alone environments.

Before it is used, the Prospecting software and the RM/COBOL run-time software, which activates it, must be installed in the computer and, in some cases, configured to the system. This process is described in detail in the ample documentation book. If non-standard terminals are used, the RM/COBOL run-time program can be reconfigured by a professional to accommodate them. Technical specifications are included.

Prospecting, once installed, will work equally well in any type of system. Although a hard-disk adds some speed and convenience, the program supports systems with as few as two diskette drives by requesting the required diskettes as they are needed. With a two diskette drive system, Prospecting will accommodate up to 3,600



```
SERIAL #: 300717      PROSPECTING      OWNER'S NAME:
                                     RELEASE 6.0

                                MAIN MENU

MANAGE                                PRINT
1 - ADD / CHANGE                     5 - PROSPECT WORKSHEET
2 - DELETE / DISPLAY                 6 - PROSPECT LIST
3 - SEARCH                           7 - PROSPECT RECORD
4 - OTHER MENU                       8 - ADVERTISING ANALYSIS
3 - TARGET                           9 - MARKETING ANALYSIS
4 - UTILITY                          10 - CARDS ( 11 CARDS NEED
                                     TO BE PRINTED)

-----
ENTER CHOICE OR 0 TO QUIT
```

Figure 1: Prospecting's main menu.

technical employees. All functions are selected through consistent-format menus which are organized and easy to use. The Main Menu (Figure 1) gives access to the customer file (via the manage section), to other menus, and to printing capability.

To customize Prospecting to a specific business, the Utility Menu is selected. Information on each customer is kept in a Record (Figure 2). The first step in the setup of the program is the naming of each item, or field, on a record. For example, Figure 2 shows a sample record for the customer of an insurance agent. Some of the fields, like name, address, and telephone number, are standard for the customers of any business and cannot be changed. Other fields, like birth date, agent number and claims made, are not standard and can be changed to fit other businesses. In the example, the names of field numbers 1 to 11 are fixed while the names of field numbers 12 to 20 can be changed. In addition, the product or service descriptions which appear below the record are user-defined. Field numbers 21 to 26 contain dates and reminders, and can be updated constantly.

Although the user-defined fields can be

(continued on p. 21)



# Can Universities Hope To Cope With Picos?

by Timothy C. Weiskel



Photo by T. Charles Erickson

Yale University

*Picos promise to redefine what is meant by education in the years ahead and thus threaten to alter universities in very radical ways.*

**P**icos and micros have not yet hit the university campus on a massive scale. When they do, it is not clear that universities can hope to cope. At the very least, these institutions will require some serious rethinking of their educational mission in a new information environment.

The reason for this is that a university is a kind of knowledge structure characterized by a particular flow of information. This information flow has carved out its own structural forms in much the same way as flowing water carves out a river bed, a gully or a canyon. By modifying the kinds of information that flows through the system and the rates at which it flows, microcomputers and particularly picos promise to redefine what is meant by education in the

years ahead and thus threaten to alter universities in very radical ways.

## Three Ingredients of Imminent Change

The immediate reasons for the impending change are three-fold. First, microelectronic circuitry has enabled manufacturers to miniaturize significant computing power into highly mobile systems, allowing students to carry sophisticated computers right to the points of customary information access. This means it is now quite feasible to enter notes from the laboratory, the lecture hall, or the library directly into electronic memory.

Secondly, software programs and communications technology have advanced to the point that individual micros, picos or



hand-held computers can now be easily integrated with larger systems, forming very powerful integrated networks for acquiring and analyzing vast amounts of information.

Finally, a computer-literate user community is just now reaching college age. For the last several years it has been true that the freshmen class often knew more about computers than the senior class in many institutions, reversing the classic profile of knowledge.

In the next few years, this will change in those institutions where it has not already done so. The result is that from their point of entry, and cumulatively as they progress, college students will expect to use computers as study aids and production tools for whatever they wish to undertake. This, in turn, will mean that some of the most creative applications of expanded computer power are likely to come forth from this user group itself—not from their formal instructors. Each of these aspects of imminent change on campus deserves some reflection.

#### **Miniature Computing Power: Small and Getting Smaller**

In the first place, the miniaturization of electronic circuitry has made it possible to manufacture very powerful information storage devices that are highly portable and easy to use. On a weekly basis the technology is updated to include more computing power in less space. Micro-computers like the IBM PC and the Apple II, themselves only about ten years old as a commercial consumer item, were first challenged by portable computers that matched their computing power. Companies like Kaypro and Compaq made machines available that could equal or better the desk-top varieties with the added advantage that they could be moved and used in a variety of work locations.

Yet this was not enough. These machines were still cumbersome and too heavy for convenient movement. By the early 1980s they became dubbed the "luggables" or "transportables" rather than simply "portables" because it was clear that moving them was still quite a production. By 1983 pico, or lap-sized, computers quickly challenged the transportables. At first the TRS80 Model 100 seemed to be the only one in the field, but subsequently manufacturers including Morrow, Grid, NEC, Epson, and Hewlett-Packard have all marketed lap-sized models with varying built-in features and a large range of compatible peripherals.

Even this may not be the end of it, however, for firms like Texas Instruments, Hewlett-Packard and Superior Systems have recently developed hand-held instruments with very impressive memory capacities.

Superior Systems, for example, has developed what it calls the OTG-PC (On-The-Go PC) which is little bigger than a normal hand-held calculator. Its versatility derives from its ability to be used as an entry device for both alphabetic or numeric data in virtually all circumstances where information can be observed or recorded.

Interchangeable "data packs" make it possible to write information to EPROM memory and store as much as 64K of data on a removable clip. Superior Systems, the distributor of the OTG-PC, is expected to expand this capacity to as much as 128K in the coming months. Furthermore, the device is programmable, so that particular kinds of information can be entered in structured formats for later analysis, and an RS 232 connecting cable can link the OTG-PC with many kinds of micro computers.

---

*"Students'  
'memory' would  
quite considerably  
out-perform that  
of most professors."*

---

On systems slightly bigger, say those of the pico or laptop variety, the increased computing power that seems to be promised in the coming months and years is truly staggering. This past July, for example, the New York Times carried an article on the "Hardcard" developed by the Plus Development Corporation of Milpitas, California (see "Miniature Hard Drive Fits on a Card," New York Times, July 2, 1985).

As it is currently designed, the unit affords the possibility of expanding the memory capacity of IBM and IBM-clone computers to a full 10 megabytes simply by inserting a card in an expansion slot. As Peter H. Lewis, author of the article, said, "even more tantalizing is the prospect that this tiny hard disk drive may soon be built into laptop computers." If this is accomplished, and there would be very powerful market incentives to achieve this objective soon, students could expect to be able to carry around the rough equivalent of 6,000 pages of double-spaced typewritten text in computing units that could easily fit under their arm or in a briefcase.

#### **Students and Information Megastorage**

When this kind of computing power is made available to students on a significant scale, we can expect major changes in the

way students acquire, evaluate and synthesize information they encounter in their normal progression through college. It is possible, for example, to carry all one's reading and class notes to each new class session. Indeed, with a three level system one can take notes on a lap-sized computer, up-load them to a micro, arrange them in a useful manner and download the notes to a calculator-sized computer to take to an exam for ready reference.

These calculator-sized computers like the OTG-PC can now hold two interchangeable memory packs of 64K each, and they are expected to be able to hold a total of 256K of information by the end of this year. With simple recall routines students can respond quickly and accurately to any questions posed by a professor on the subject matter in class or on an exam. Assisted in this manner a student's "memory" would quite considerably out-perform that of most professors.

Along with this capability comes the ability to store formulae and call up executable programs from an interchangeable EPROM cartridge. Since a dozen or more of these cartridges can be stuffed in pockets, there is virtually no limit to the amount of recallable structured information that students now have access to through hand-held systems. Students equipped in this way have enormous advantages on almost any form of examination.

Longer-term assignments to students are also affected by this new technology. During the composition of any paper or written assignment, students can ask the computer to print out or flash on the screen any notes they may have taken in class on what the professor had to say about that particular subject. Over time, students can constitute their own cumulative databanks of all notes in all classes they ever enrolled in, and in this way they can rapidly integrate learning they had encountered in separate courses over a possible span of several years.

In this process students will be empowered to become the architects of their own learning itinerary in a much more integrated manner than seems possible in the limited days of spiral notebooks. Used in a sensitive manner, electronic note-taking technology can enable students to become the monitors of their own intellectual development.

As their perspective in a particular subject matures over the years, their notes, sorted in chronological order, can reveal this to themselves. Professors may wish to make observations about this progress, but the students themselves will be best equipped to witness the ground they have covered. New kinds of learning itineraries, then, are clearly possible simply by regularly employing electric data entry devices with patterned recall capability.



## Software Programs and Communications: Vast and Getting Cheaper

If this were all that is happening, things would be quite impressive as they are. But even more substantial changes are involved in student computing capacity when the advances in miniaturization are combined with those in software development and communications technology. Software is currently available that enables students to assemble, integrate, analyze and synthesize information on an unprecedented scale and in ways never previously feasible during their short years in college.

Consider normal college activities. Sooner or later in their college years, students find themselves having to study, at least a little bit. This has customarily involved "hitting the books" at some point. In an electronic age, however, this whole process looks a lot different than it used to just a few short years ago. It used to be common for students to encounter books in a library. To do so they would look up subjects or authors in a card catalog and copy down reference numbers to find books on shelves in the stacks.

This process still goes on in a lot of colleges, but in some university libraries the whole procedure is now computerized to such an extent that students are able to browse through an on-line catalog that displays the book reference information for them conveniently on a computer screen in their own dormitory rooms. Furthermore, they can indicate from their rooms that they would like to check out the book and pick it up at a particular locale.

The wonders do not stop here. Those with money to spend on such things are no longer confined to the research facilities of their particular college or university library. With a pico or microcomputer, a modem and an account with one of the commercially available databases, students can acquire direct access to such massive bibliographic databases as the Science Citation Index, American Life and History, Sociological Abstracts or the Library of Congress itself.

Some of these on-line services offer abstracts as well as simple bibliographic citations, and in some cases it is possible to consult full-length documents online as well. In any case, a variety of document vendors make it possible for anyone with a pico computer, a modem and a little money to order xerox copies of the full text of any citations they come across.

Indeed, a student may well wonder why he needs to conduct any of his own research any more, for small firms of information brokers who have become skilled in this kind of online research are springing up around most major campuses, providing re-

search services that are structurally similar to the old term-paper ghost writing services. Since the results of this kind of on-line research can be delivered to any student on diskettes which enable him to integrate it with word-processing software into anything he may wish to write, it is very difficult indeed to trace where the work of a student begins and where the work of others is reflected.

Even where external on-line databases are not involved, very new kinds of learning are opened up with the software and communications technology currently available. Collaborative research is very considerably assisted by this technology. Subjects can be jointly researched and the results shared almost instantaneously nationwide or internationally over computer networks. Two or more authors can combine manuscripts, alter stylistic idiosyncrasies and standardize their texts in seconds or minutes rather than days or weeks.

Truly collective work is also possible. A college seminar can construct a collective bibliography, for example, in such a way that each member of the class benefits from the research of everyone else.

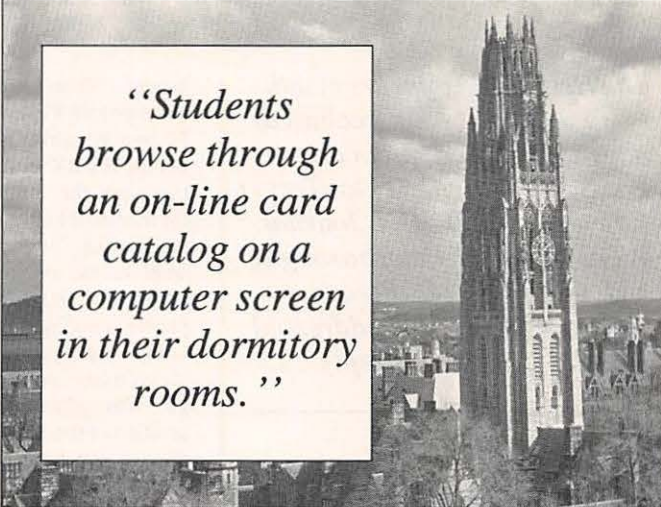
Furthermore, such works can in principle now be published very much more widely than was previously feasible. Communication technology now makes it possible to ship electronically assembled material to typesetting devices over the normal phone lines. In the coming years it is probable that college departments, student groups, seminars or study groups will be able to publish their proceedings in finished form with very inexpensive laser printers.

Already in a number of college towns it is possible for students to go into Kinko's, a commercial xerox copying establishment, with a Macintosh diskette that contains a "paper" and get it printed out with a near type-set quality on a Macintosh laser printer. It is technically possible, and no doubt commercially quite attractive, to make this kind of laser printing available for source material from a large variety of pico and microcomputers simply by developing diskette conversion facilities in conjunction with the laser printer itself. When this occurs it will be possible for groups or indi-

viduals to print term papers, dissertations, pamphlets, books, and journals at rates which are currently as rapid as eight pages per minute and will soon increase to twice that speed.

## A Historical Formula for Computing Progress

When viewed in overall terms, the pace of recent change in miniaturization and communication technology and the falling prices of hardware and software in this realm is very staggering indeed. Two MIT scholars have recently calculated that "each year since 1960 the price of comput-



*"Students browse through an on-line card catalog on a computer screen in their dormitory rooms."*

er chips has fallen by 25 percent and the cost of memory by 40 percent; while speed has increased by a factor of 200. In the same period, the overall cost, energy consumption and size of computers of equal power have declined by a factor of 10,000."

The MIT scholars conclude with an interesting analogy that highlights the scope of the change we are in the process of experiencing: "If the aircraft industry had evolved as spectacularly as the computer industry over the past 25 years, a Boeing 767 would cost \$500 today, and it would circle the globe in 20 minutes on five gallons of fuel." (cited in the New York Times, July 2, 1985.)

University structures are intimately bound up with the processes of information flow, and it is likely that as the newly developed information technology becomes more widely dispersed among students and faculty, universities are likely to experience transformations even more radical than those the airline industry experienced with the introduction of jet travel. ■

*Timothy Weiskel is a professor of anthropology at Yale University.*



# Printing's Pressing Problems

by Terry Kepner

*The Help Menu appears monthly to answer your technical questions about picocomputers. Send your queries to: Terry Kepner, c/o PICO's Journal, WGE Center, Peterborough, NH 03458-1194. Please enclose a stamped, self-addressed envelope for Terry's reply.*

Dear Terry:

Before I bought my Model 100, I carried my Qume serial printer into the Radio Shack store and had the salesman demonstrate that the computer could print on this machine. Nothing but a null modem adapter was required. No program was needed.

It has been a year and a half since then, and I've forgotten how he did it. He's gone now and none of the present Radio Shack personnel can help. I DO remember that the computer prompted for line width. Can you help?

Robert Elliot, Jr., New York, NY

It sounds like the salesman just used the TELCOM program to send your files to the printer through the serial port.

First, connect the computer and the printer with the null modem, then turn on both machines. Move the cursor on the Model 100 display to TELCOM and press ENTER. In TELCOM, press the F3 button to change the communication parameters. Set the word length, baud rate, stop bits, and parity bits to those used in your Qume printer (the printer manual will tell you where to find the switch settings that control these parameters in the printer, so you can determine the setting it is currently using).

After setting the parameters on the

Model 100 and pressing ENTER, press F4 to go into TERM mode. Now press the F3 button, which is used to upload a file out the RS-232 port of the Model 100. At this point the computer will prompt you for the line length it should use when sending the file. Type in the line length you want to use on your printer and press ENTER. Your file will be sent to the printer, one line at a time.

The disadvantage to this method is that you have no control over the left margin. The printing starts at the leftmost position of the printhead. One way around this, if you have sufficient room to the left of the printhead on the platen, is to move the paper to the left, making the printhead start at some distance from the paper's left margin. If you have the room, you can easily set a one inch left margin in this manner. By giving a line length of 65 characters (which is 6 1/2 inches using a 10 character per inch font), you'll end up with a standard letter format with a jagged printed right margin of about an inch.

Your other choice is to buy a print formatting program for your Model 100 that gives you control over the margins and also lets you select the RS-232 port as an output device instead of defaulting to the parallel port. Good luck.

Dear Terry:

I wrote this program (see Listing 1) to emulate the built-in FILES command, except that it sends the file names to a line printer instead of the display. To change the program to right-justify the file names, remove the first REM command in line 95 and add a REM command to the beginning of line 115.

Fred Sundstrom, Chillicothe, IL 61523

Thanks for the program. I recognized the address as the MENU area on the NEC 8201. If anyone needs a way to get

a hardcopy of the file names in the menu of your Model 100 or an Olivetti, try Fred's program with the following changes.

If you have a Model 100, change the value of B in line 40 to -1606. For an Olivetti M10, the value should be -1603. Also change the test value of A in lines 60 and 70 to 19 for both the Model 100 and the Olivetti M10. ■

Listing 1 by Fred Sundstrom

```
10 LIST OF FILES PRINT-OUT
20 DEFINT A-Z:CLS:SCREEN,0
30 PRINT:FILES:PRINT
40 B=-1903
50 FOR K=1 TO 7
60 IF A21 AND PEEK(B)=0 THEN
  B=B+11:A=A+1:GOTO 60
70 A=A+1:IF A>21 THEN END
80 X$="":Y$="":FOR J=3 TO 8:IF
  PEEK(B+J)>32
  THEN Y$=Y$+CHR$(PEEK(B+J))
  ELSE X$=X$+" "
90 NEXT
95 REM Y$=X$+Y$:REM PUT THIS
  STATEMENT IN TO RIGHT-
  JUSTIFY FILENAMES
100 LPRINT Y$;
110 LPRINT " ":FOR J=9 TO 10:
  LPRINT CHR$(PEEK(B+J));:NEXT
115 LPRINT X$;:REM TAKE THIS
  OUT TO RIGHT-JUSTIFY FILE-
  NAMES
120 LPRINT " ";
130 B=B+11:NEXT
140 LPRINT:GOTO 50
150 END
```

Terry Kepner is a featured monthly columnist in 80 Micro. He has been writing about computers since 1979.



## PROSPECTING

(continued from p. 16)

named almost anything, they can only contain specific types of data. Fields 12 and 13 must contain dates; fields 14 and 15 can contain up to five characters each; field 16 can contain up to 15 characters; and field 17 contains an eight-digit number. The remaining fields, 18, 19, and 20, are selection fields and have a special use. To enter data in these fields, the user chooses from a list of possible selections which are defined during the setup of the program. For example, field 18 can contain a 15 character data item chosen from a list of 20 possible selections.

*“Prospecting allows unparalleled flexibility.”*

If field 18 is named Occupation, some of the possible selections might be defined as Programmer, Broker, and Farmer. Each time a user is called upon to enter the occupation of a customer, a list of possible selections appears. The lower half of the record, the product description, is also selected from lists of up to 40 choices.

When the fields are named and the choices for the selection fields are entered, Prospecting is set up to handle the specific needs of the business. Actual customer information can then be entered. Once filled with customer files, Prospecting allows unparalleled flexibility in searching files, printing forms and reports, and interfacing with word processing programs.

The Search procedure is flexible and menu driven. The field you want to search plus up to five search criteria from a field of 20 options extends search possibilities. If a specific name is being searched for and not found, Prospecting displays surrounding records. It would take only a moment for a switchboard operator to have a telephoning customer's information file.

Prospecting also creates a wide range of reports used by various departments within a business, such as a Prospect analysis (Figure 3), and a Marketing analysis. The items to be analyzed are selected by the user. The reports can be based on all records or on records that meet selected criteria. Index or Rolodex cards, and mailing labels in any size or quantity can be defined and printed.

Prospecting will interface with most word processors which use standard ASCII characters. Form letters can be printed with the date, name, address, and greeting fields from selected Prospecting records.

Prospecting is a customized data base management system that can be configured to meet the needs of most businesses. It enables a business to provide excellent customer service and sales support. Implementing it, though, requires a significant investment in time and planning. The abilities and limitations of the software need to be carefully considered before making this investment.

Key Systems is aware of the need for extensive customer participation and offers a full refund if the program is returned before the package containing the diskettes is opened. This allows prospective users to examine the documentation booklet and understand the scope of Prospecting before committing to the purchase price. ■

Mark Robinson is the director of operations for Campbell Communications Corp., a Peterborough, N.H., publishing and mailing company. He is the co-author of two books on business applications programs published by Scott Foresman & Co.

### PROSPECT RECORD

```

RUN DATE 10-06-85
1) PROSPECT INDEX - MANLEY, GEORGE A.
2) PROSPECT NAME - Mr. George A. Manley
3) ADDRESS LINE 1 - 48576
4) ADDRESS LINE 2 - 35th Street
5) ADDRESS LINE 3 - Anytown, USA
6) ADDRESS LINE 4 -
7) POSTAL CODE - 23478
8) LETTER GREETING - Mr. Manley
9) TELEPHONE NO. - 273 857-2635
10) SOURCE OF LEAD - OTHER RAD
11) FAST ANSWER - 00
12) DATE OF LEAD - 09/15/83
13) BIRTH DATE - 02/16/39
14) AGENT NUMBER - 2
15) DISTRICT - 3
16) SOC. SEC. # - 374 34 6209
17) ESTIMATED INC. - 65,000.00
18) OCCUPATION CAT. - DOCTOR
19) INSURABILITY - GOOD
20) CLAIMS MADE - AUTO BOAT FARM-ANIML
21) 11/01/83 - Farm animals are on buy/lease deal
22) 11/15/83 - Needs malpractice ins
23) _/_/_ -
24) _/_/_ -
25) _/_/_ -
26) _/_/_ -

```

TYPE OF INSURANCE	NAME OF CARRIER	LEVEL OF INTEREST	AMOUNT OF COVERAGE	DATE OF ISSUE/BIRTH	DATE OF EXPIRATION	MISC. NOTES
1 AUTO	SENTRY	BOUGHT OTH	200,000.00	_/_/_	_/_/_	
2 BOAT	SAFECO	PURCHASED	200,000.00	10/10/83	10/10/85	
3				_/_/_	_/_/_	
4				_/_/_	_/_/_	
5				_/_/_	_/_/_	
6				_/_/_	_/_/_	
7				_/_/_	_/_/_	
8				_/_/_	_/_/_	
9				_/_/_	_/_/_	

Figure 2: A Prospect record.

RUN DATE 10-06-85		PROSPECT ANALYSIS BY SOURCE OF LEAD		
SOURCE OF LEAD	# OF PROSPECTS	# SOLD	% SOLD	
TEL. CMFGN	2	1	50.0	
SPOUSE	1	1	100.0	
C. J. ADV	1	1	100.0	
WAVE RADIO	2	2	100.0	
WLKY RADIO	1	1	100.0	
CHAN 11 TV	1	1	100.0	
CHAN 41 TV	2	2	100.0	
OTHER RAD	2	2	100.0	
OUTDOOR AD	1	1	100.0	
LOU MAG AD	5	5	100.0	
YEL PAGES	2	2	100.0	
ADV AGENCY	3	3	100.0	
* TOTALS *	23	22	95.7	

Figure 3: Prospecting analysis by source of lead.

### Manufacturer's Specifications:

Key Systems, Inc., 512 Executive Park, Louisville, KY 40207 (1-800-223-5637).

Price: \$395 (single user); \$595 (multiple users).

System Requirements: CP/M, MTM, Xenix, MS-DOS, PC-DOS operating system; for hard disk drive - 1.3MB per 1,000 prospects; for 2 disk drives - 320K per drive; 128K RAM.



# Jazz Up Your Model 100's LCD Display

by Terry Kepner

Occasionally, if you write your own BASIC programs, you yearn for a few simple commands to jazz up your program a bit. But you don't want to add anything long—after all, space IS at a premium in a pico. Here are four suggestions.

Here is a POKE that lets you turn on the reverse video characteristics of the Model 100 LCD display: *POKE 63048,1*. Restoring the display to normal is just as easy: *POKE 63048,0*. The first POKE takes the same amount of room as the standard method of enabling reverse video: *PRINTCHR\$(27)"p";*. But the second POKE is actually shorter than the normal method of turning it off. Both are slightly faster than their PRINT equivalents. No matter which method you use, returning to MENU turns off the reverse video.

Another feature you might want to consider is the LABEL line which you can turn on and off with either the LABEL function key or the SCREEN command: *SCREEN,1* turns it on and *SCREEN,0* turns it back off. Occasionally you will design a screen into your program that pressing LABEL will ruin. Here is a POKE to prevent a user from pressing the LABEL key to turn the label line back on: *POKE 64173,0*. After this poke is issued, pressing the LABEL key will have no effect. If the label line is on, it will stay on. If it is off, it will stay off. To restore the LABEL key's access to LABEL line, type *POKE 64173,1*.

As with the reverse-video poke, returning to the MENU from BASIC will automatically restore the LABEL key's function.

Frequently when you are trying to design a menu screen for the LCD, you want to know just where the cursor is before you let the program start sending information to display. *PEEK(63040)* will tell you the current line that the cursor is sitting on, and *PEEK(63041)* will tell you the horizontal print column occupied by the cursor.

Here are two locations that will tell you where the information you want to display is going to end up on the LCD: *PEEK(63033)* will tell you the next line to be used on the display (one is the top line,

eight is the bottom line); and *PEEK(63034)* will tell you the next horizontal print position, or column, that will be used (starting with column one on the left and running to column 40 on the right).

Associated with these two positions in memory are two others that programmers can have a lot of fun using. The first, 63035, can be used to protect the bottom lines of the LCD from the cursor. For example, *POKE 63035,4* will prevent the cursor from going below the fourth line of the display. In other words, you could put information on line seven of the LCD and use this poke to prevent it from being overwritten as the screen fills up.

Similarly, you can protect the right side of the display from being used by typing *POKE 63036,20*, effectively reducing your display size to eight lines by 20 columns! As with the other pokes in this column, returning to MENU resets them to their normal values, eight and forty, respectively.

As you may know, the random number generator in the Model 100 always starts with the same number (that is, typing *PRINT RND(1)* always gives the number .59521943994623 the first time, .10658628050158 the second time, and so forth). If you've written games for the Model 100 that use this function, or if you need the function for numerical analysis, the fact that you always start with and keep the same numerical progression is a frustrating fact. Here are some suggestions to solve that problem.

The most obvious method is to use the INKEY\$ function in a loop, continuously calling the RND function until the user presses a key. The amount of time it takes the user to react to the prompt "Press any key to continue" will be a random factor, preventing the user from starting with the same sequence more than once. Here is an example:

```
10 PRINT "PRESS ANY KEY TO CON-
TINUE" 10 A=RND(1) :A$=INKEY$
:IF A$="" THEN 10
```

The problem with this technique appears when the person using the program takes advantage of the fact that the Model 100 will store keystrokes before they

are used. For example, if a program has this INKEY\$ routine as the first line, the user could type RUN and hit ENTER twice, rapidly. The first ENTER would start execution of the program, the second one would be stored in the keyboard buffer. When the INKEY\$ loop is reached, the previously stored ENTER is immediately given to the INKEY\$ command and the program continues after calling the RND function only once. A clever user can then start with the same numerical sequence. This technique is still useful in some situations.

Better and faster results can be obtained by just inserting *POKE 64634, PEEK(63791)* into your program. This will start the random number generator with one of 125 values.

A much better approach, for those situations requiring higher odds, is to go directly to the random number seed at locations 64634-64639 and fill them with a series of numbers that are themselves a random set, or at least will appear to be random.

One way to do that is to read the current date and time from the computer's memory and put them into the random number seed locations. Because the clock is always ticking and time continuously moves forward, the only way to get the same sequence twice would be to set the date and time functions to a predetermined value, and immediately call the program that transfers this information to the random number seed—which means your user would have to stop your program, set the date and time, then continue the program from where it was interrupted.

Putting the time and date into the random number seed locations will give roughly 31,536,000 different starting numbers, one for every second in the year. It's easy to do once you know the locations in memory of the time and date. Here's a one-liner that does just that:

```
FOR A = 0 TO 4 :POKE A + 64634,
PEEK (A * 2 + 63795) + PEEK (A * 2
+ 63799)
```

Hopefully, these suggestions will make it easier for you to design efficient and fast programs for your Model 100. Good luck.◆





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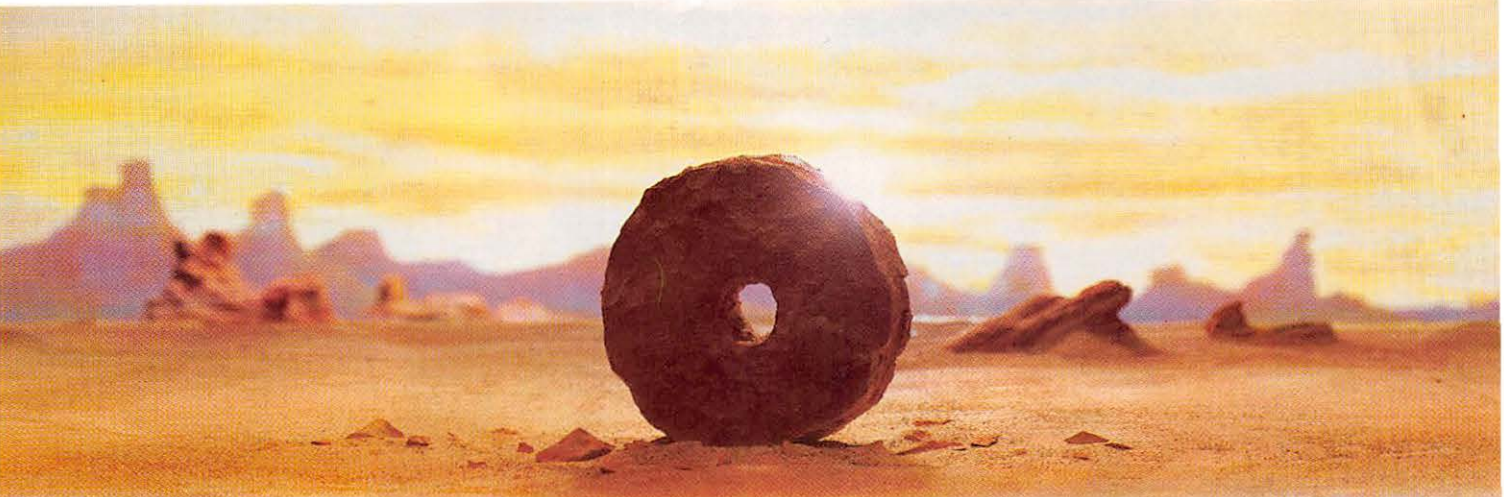
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In case you ever get lost or confused, just type in "H" for help, and we'll immediately cut in with instructions that should save the day.

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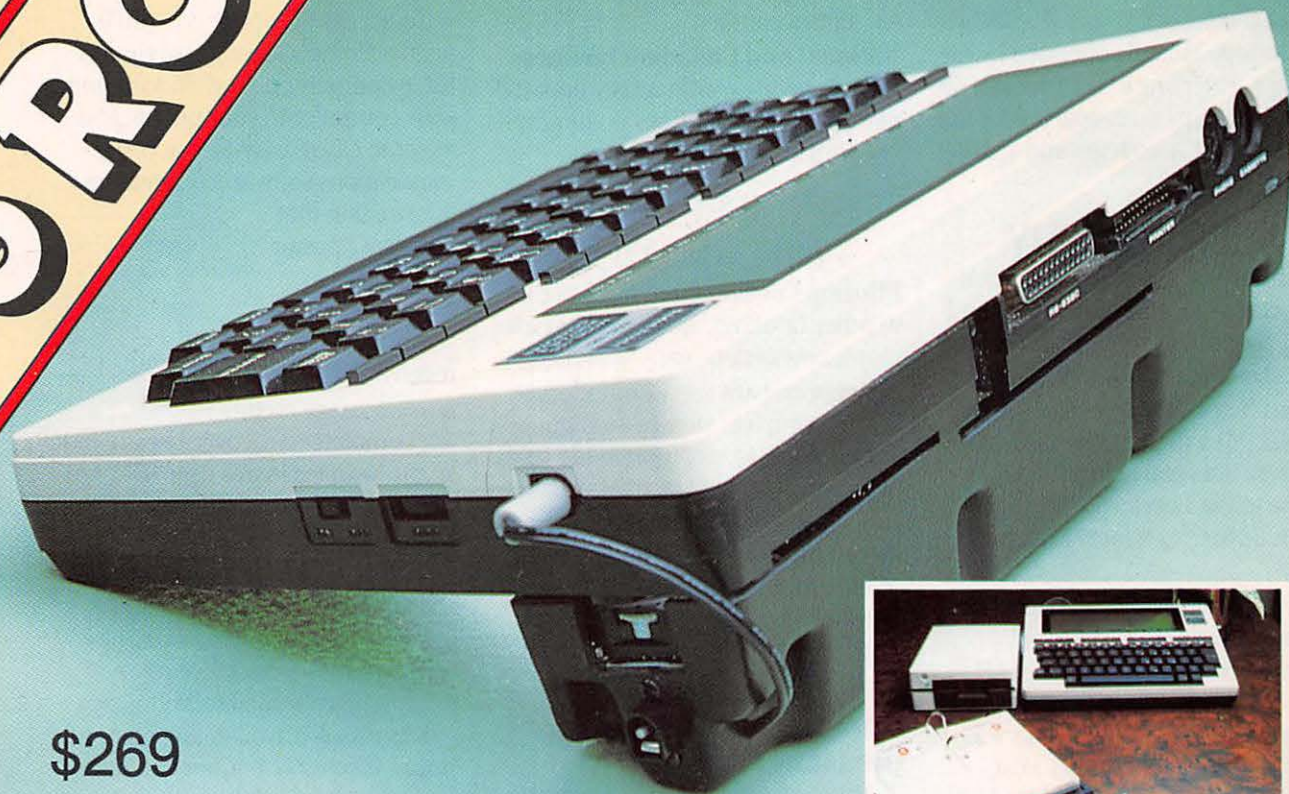
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The ROM bank props up the Model 100 at the same angle and height as those little legs you've seen. The ROM BANK itself is only about 1½" deep and it runs the width of your Model 100. It only weighs one pound. It not only installs instantly, but it pops free in a second if you need everything to lie flat in a briefcase.

**Change from ROM to ROM with the touch of a thumb switch.**

You can go from LUCID to WRITE to DISK+ to any other ROMS just by turning the thumb switch at the side of the ROM bank. The 6 ROM BANK is a sturdy well built construction that looks like it is a part of your Model 100.

What is also fantastic is that the ROM bank has a powerful NICAD battery and recharger built right in. This power source supplies up to 30 hours of life to your Model 100 with just 6 hours of recharge. What's nice is that it recharges right from your Model 100's power adapter. This is a quick charge system and if you need power in a hurry, you can get 6 hours of life for your Model 100 by just charging for an hour and half.

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Edited by Gisela Bickford

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A new device can revolutionize data entry. The ScriptWriter allows computer input as it is being written—not typed—with an ordinary ball-point pen on a standard sheet of paper or printed form. "Recognition technology" has provided a natural way to communicate with computers. The device can also enter graphics and replace a mouse or other cursor positioning device.

Data Entry Systems has designed the ScriptWriter to be used to enter uppercase printed (sor-

ry, no creative cursive) data onto a 1040-A tax form, for example. The handwritten data is interpreted as it is written and transmitted to a computer which then computes the taxes and prints a return.

The LCD display shows two lines of 20 characters. Compatible with an RS 232 interface, its programmable control functions provide utilization of specialized software.



ScriptWriter from Data Entry Systems reads your writing for data entry.

For pricing and additional information, contact Data Entry Systems, 6767 Madison Pike, Suite 195, Huntsville, AL 35806 (205-830-2766). Or circle #72 on your Reader Service card.

## Epson Sprouts Another Daisy

Epson's daisywheel printer, DX-35, has a wide carriage of 136 columns for 10, 12 and 15 characters per inch. At 35 characters per second, the printer offers friction paper feed, a Diablo-compatible interchangeable daisywheel, 3K print buffer and Diablo All-Purpose Interface (RS-232C, IEEE-488 and parallel). Tractor and cut sheet feeders for high-volume word processing are optional.

Third in a line of three, the DX-35 gives larger offices letter-quality correspondence, accounting ledgers and spreadsheets. Features include proportional spacing, bold script, underlining, super and subscript, bold shadowing and doublestrike.

The DX-35 runs word processing software which contains Diablo 630 drivers, including Wordstar, Word and 1-2-3. An optional key-



The Epson DX-35 daisywheel printer offers a wide carriage plus Diablo compatibility.

board lets the printer operate like a typewriter—a useful feature for envelope typing, letting you bypass the computer screen.

A one-year warranty accompanies the \$900

printer. More information is available from Epson, 1901 Avenue of the Stars, Los Angeles, CA 90067. Or circle #60 on your Reader Service card.

## Small Enough To Fit in Your Hand

### ...The CM-100 Scores in Math

Advanced computer math functions are fueled by light (a silicon solar battery). Unless you can do it in your head, CM-100 converts binary/octal/decimal and other modes for you. Its other talents include arithmetic operations with parentheses, memory and constant calculations, logical operations, and shift functions.

Engineers, programmers and students will also take to the \$20 price of this full-feature dedicated computer math calculator. Information is available from Casio, 15 Gardner Road, Fairfield, NJ 07006 (201-575-7400). Or circle #61 on the Reader Service card.

### ...FX-7000G Displays Graphs

Numerical equations in graph form are visible at the touch of a key. Scientific and engineering



The CM-100 performs advanced computer math functions powered by a silicon solar battery.

applications benefit from a 2 by 1½-inch liquid crystal panel. The small device measures 3.3 by 6.5 by ½ inches and weighs only 5 ½ ounces.

Numerical value changes in a formula are shown on a graph. More than one function equation can be displayed as a graph, and several



equations can be combined in one graph. Four times faster than a conventional calculator, the FX-7000G is priced at \$100. More information is available from Casio (see item #61). Or circle #62 on your Reader Service card.



## Pico Allies from Alliance

### ...Printer Jack

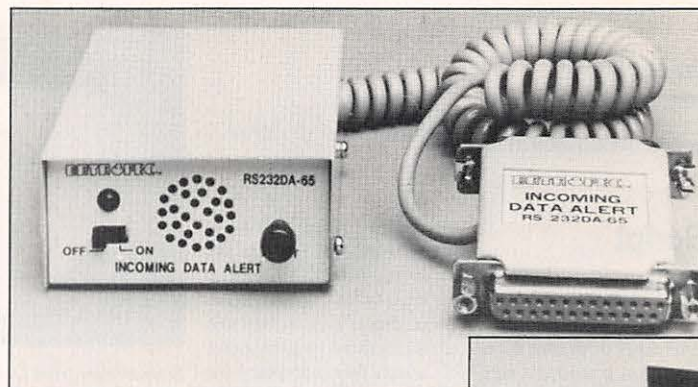
The Apple IIc gets a helper called Printer Jack which interfaces the serial-only printer port to a centronics type parallel port enabling the IIc to connect to most parallel printers on the market.

Printer Jack comes with a cable assembly for the IIc. The main unit has a cable with 36 pin centronics-type connector to plug into the printer. The other end is a five-pin Din connector to the IIc's serial port. An AC adaptor powers the Printer Jack in case the printer does not provide power.

Priced at \$88, more information is available at Alliance Research Corp., 20120 Plummer St., Chatsworth, CA 91313 (818-701-5848). Or circle #63 on your Reader Service card.

### ...IDA (Incoming Data Alert)

Save time with a device that monitors electronic mail systems. It detects incoming data signals on an RS-232 data line. Upon detecting a signal, it sounds a beep for 15 seconds and a red LED stays lit until reset. Applications for the device are varied—it frees personnel from CRT or printer monitoring, waiting for data to arrive. Con-

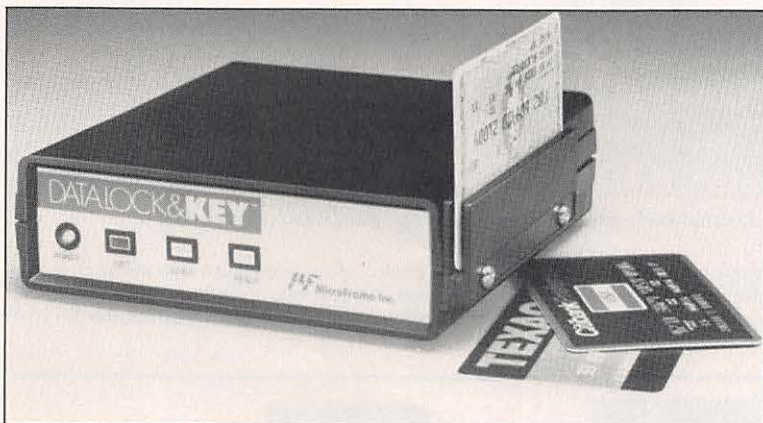


*Incoming Data Alert (IDA) for RS-232 devices.*

### Printer Jack, serial to parallel interface for the Apple IIc.

nected with a modem, it alerts the user to data arrival. In electronic mail applications, it monitors lines for messages.

The IDA can be connected in series with any RS-232 line. It uses a 9V battery and comes with dual DB25 female connector on each end of the adaptor. Priced at \$50, more information is available at Alliance (see item #63). Or circle #64 on your Reader Service card.



*The MagnaKey device reads conventional credit cards for terminal access to a mainframe.*

## MagnaKey

The MagnaKey device reads conventional credit cards. The card is your identification as one of multiple users at a single terminal with access to a mainframe protected by the Data Lock and Key system. The Data Lock unit is plugged between communications modems and the mainframe to isolate the host from all incoming calls until it completes a verification dialogue. The Data Lock protects the host; the Data Key with the MagnaKey option at the remote site allows multiple users at one Data Key unit.

To gain access to the mainframe, the user passes a magnetic striped credit card into the MagnaKey card reader and dials the host telephone number. Access is granted or denied in less than two seconds. The price is \$550.

For more information, write MicroFrame, Inc., 205 Livingston Ave., New Brunswick, NJ 08901 (201-828-4499). Or circle #65 on your Reader Service card.

## Password 300

Inexpensive, but good, this 300-baud modem offers auto-dial/auto-answer functions and audio phone line monitoring. The modem comes with an RS-232C cable and offers full duplex, switchable operation, and the option to dial from the keyboard. It uses the AT command set.

More information is available from U.S. Robotics, 8100 McCormick Blvd., Skokie, IL 60076 (800-DIAL-USR). Or circle #66 on your Reader Service card.



*The Password 300 modem from U.S. Robotics.*



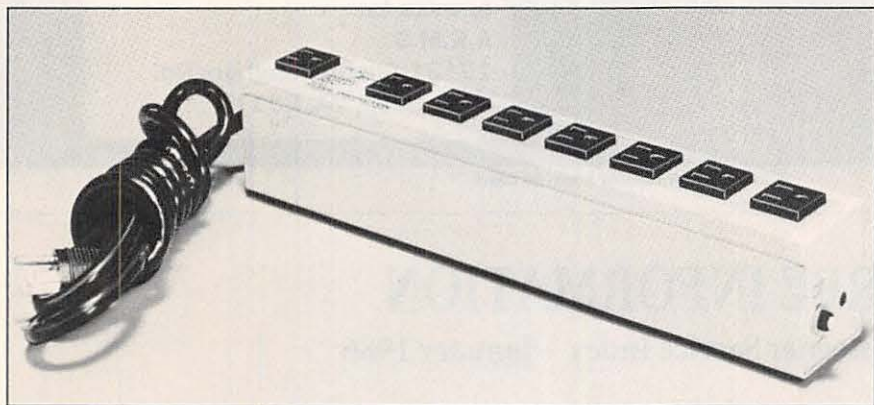
## Epson's AP-80

The AP-80 dot matrix 80-column printer provides the Apple II with hardware plug compatibility plus full software compatibility with the Imagewriter. The printer offers features including front panel selection of near letter quality and margins, plus software selectable italics, bold, double width, proportional, super and subscript types.

The printer operates at a rapid 75 cps in draft mode and 15 cps in near letter quality, both bidirectionally and unidirectionally. Both friction and tractor feed are standard.

A one-year warranty accompanies this \$380 printer. More information is available from Epson at 1901 Avenue of the Stars, Los Angeles, CA 90067 (213-557-1331). Or circle #69 on your Reader Service card.

*Epson's AP-80, a versatile printer, offers compatibility with the Apple IIc.*



*The GD-1495 control socket sends power to six or more outlets.*

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For more information, contact Heath, Benton Harbor, MI 49022 (616-982-3210). Or circle #68 on your Reader Service card.

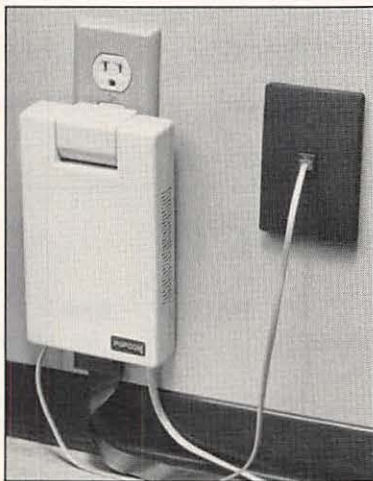
## Popcom X100

This Hayes-compatible modem features automatic voice-data switching and is compatible with RS-232 cables. Specifications include full duplex operation, 300 to 1,200 bps, serial asynchronous automatic data formatting and a 40 character line buffer.

The X100 automatically takes instructions from your PC or terminal and reports to your PC dial tones, busy signals, remote ringing, talk, and line disconnect. It offers an "in-use" light on multi-line phones and fits on the wall or desk.

The cost is \$475 and more information is available from Prentice, 266 Caspian Dr., Sunnysvale, CA 94088 (408-734-9810). Or circle #70 on your Reader Service card.

*The Popcom X100 modem from Prentice.*

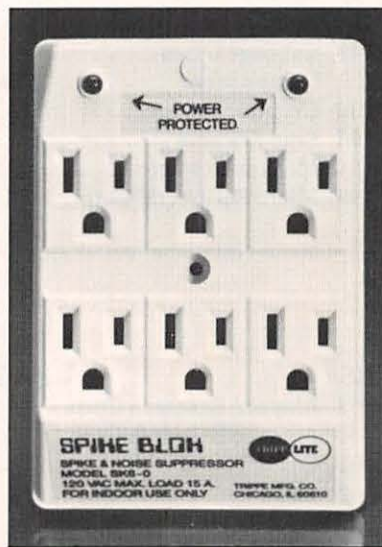


## The Spike Blok

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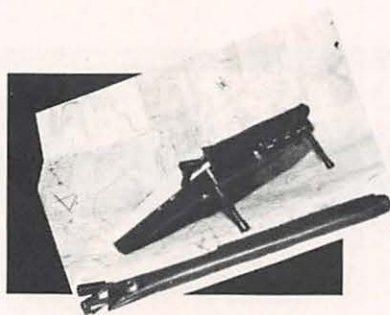
*Tripp Lite offers the Spike Blok.*





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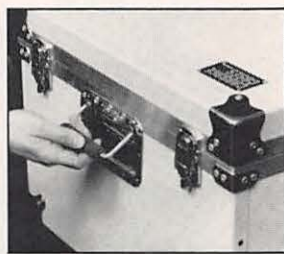
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- 5. Both Serial and Parallel Communications** are provided as a standard feature.

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The Thin E/L is priced from \$200 to \$350 depending on computer model. The ThinWrite 80 Battery Powered Printer is priced at \$449 F.O.B. Salt Lake City, Utah.



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Text processing power that no other program can equal.

## PCSG says "Send it back in 30 days for a full refund if you don't agree."

on Snap-in™ Cartridge \$99.00



WRITE ROM is the definitive word processing extension for the Model 100. PCSG the first text formatter for the Model 100, now sold by Radio Shack as Scripsit 100. Now 18 months later PCSG introduces WRITE ROM. Those who have experienced it say WRITE ROM literally doubles the power of the Model 100.

First of all, WRITE ROM as its name implies is on a snap-in ROM. You simply take a quarter and open the little compartment on the back of the Model 100 and press it in. It is as easy as an Atari game cartridge. You can use other ROM programs like Lucid whenever you wish.

WRITE ROM lets you do every formatting function you would expect like setting margins, centering, right justifying and having headers and footers. But it does them under function key control.

WRITE ROM remembers your favorite format settings so that you can print a document without any setup, but you can change any formatting or printing parameters instantly with a function key.

WRITE ROM's "pixel mapping" feature shows you an instant picture on the screen of how your printout will look on paper.

In all there are 64 separate features and functions that you can do with WRITE ROM, and some of these features are truly breakthroughs for the Model 100.

First, WRITE ROM lets you do search and replace. Any word or phrase in a document can be searched for and replaced with any other phrase where the search words appear.

Second, WRITE ROM lets you send any text (formatted or not) to any other computer over the phone with just a function key. What's more it dials and handles sign on and sign off protocol automatically.

Third, WRITE ROM has a wonderful feature called Library that lets you record favorite phrases, words or commonly used expressions (often called boilerplate).

Any place you wish any Library text to appear you just type a code. WRITE ROM automatically inserts the text just like a Xerox Memory Writer.

Picture what you can do with that kind of capability.

WRITE ROM is blindingly fast. No one can claim faster operation. Because it is on ROM it uses virtually none of your precious RAM. It works with any printer, serial or parallel. You can make a duplicate copy of a document file under a new filename. Rename or delete (kill) any RAM file with function key ease.

This description only scratches the surface of the amazingly powerful piece of software. Dot commands allow control of such things as margins, centering, line spacing and other changes in the middle of a document. Most are Wordstar compatible.

A mail merge feature allows you to send the same document to every name on your mailing list, personalized for each recipient.

WRITE ROM enables you to do underlining, boldface and correspondence mode as well as any other font feature like superscripts that your printer supports in a way that many users say "is worth the price of the program."

To underline you don't have to remember a complicated printer code. You just type CODE U, and to stop underline, CODE U again. The CODE key is to the right of your spacebar. Boldface? CODE B to start and stop. Easy to remember and do. Five different printer features of your choice.

We couldn't list all the features here. For example, not just double space but triple or any other. You can use your TAB key in a document. WRITE ROM allows you to indent. This means you can have paragraphs that have a first line projecting to the left of the rest of the paragraph. Plus many more features.

WRITE ROM has a feature unique to any word processor on any computer. It is called FORM. FORM is an interactive mechanism that lets you create screen prompts so that you or someone else can answer them to fill out forms or questionnaires.

With FORM anyplace where you had previously typed a GRAPH T and a prompt in a document, WRITE ROM will stop and you are shown that prompt on the screen. You can type in directly on the screen and when you press F8 you see the next prompt. Goes to a printer or a RAM file.

Think of how you can use FORM. A doctor or nurse could use it for a patient's history with each question appearing on the screen. An insurance salesman could have his entire questionnaire. You could construct a series of prompts to answer correspondence typing the answers, even using Library codes. This feature lets you answer letters in rapid fire fashion each with personalized or standard responses.

Before WRITE ROM you had to be a programmer to create a series of prompts. Now it's as simple as GRAPH T.

PCSG makes the claim that WRITE ROM is the easiest, fastest and most feature rich formatter for the Model 100. We are happy to offer WRITE ROM because it expands the 100 to a dimension of text processing you cannot equal on even larger computers.

We brashly state that WRITE ROM is the best you can buy. But put that to the test. If you aren't as excited as we are return it for a full refund. Priced at \$99.00 on snap-in ROM. MasterCard, VISA, American Express and COD.

ALSO AVAILABLE FOR  
THE MODEL 200.

1-214-351-0564

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## FOR PERFORMANCE YOU WILL WANT TOMORROW...

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**\$599.00\***



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### **Power...**

- Menu driven load/store capability for transferring individual files or total memory to disk.
- CP/M operating system makes available a world of popular software: dBASE II, Wordstar, Supercalc, and much, much more.
- T/Maker software option (\$200.00) provides: word processing, spreadsheet, data base manager, spelling checker, bar graphics.
- Uses 3½" diskettes (360K).
- 64 K bytes of RAM (with your 32K) (8K chips, \$30).

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- Totally portable, lightweight, attaches easily.
- Battery powered, rechargeable, plenty of advance warning on low batteries.
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- The cost of a PICDISC System represents substantial savings over ROM-based systems. You'll have much greater potential for a smaller investment. Call us today, we'll send our price comparison charts.

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CP/M, dBASE II, Wordstar, Supercalc & T/Maker are trademarks of Digital Research, Ashton-Tate, MicroPro, Sorcim, & T/Maker respectively.

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MODEL 100—MODEL 200—NEC 8201 USERS

# TEXT COMPRESSION

## ADDS MEMORY

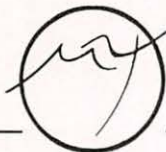
using  
**Lap Coder®**

- Store 50% more text—Without adding RAM!\*
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Simply move the cursor over the name of the file to be compressed or expanded and press ENTER.
- Lap Coder® replaces words in your text files with a tightly packed code. Store 42K per full bank (M100 NEC).
- Cut save-load and modem time by 1/3.\*
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\*Average use.

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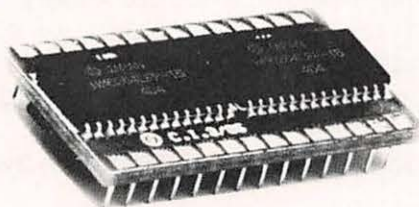
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## 24K Expansion RAM

For the Model 200

\$99. each

\$190. for two

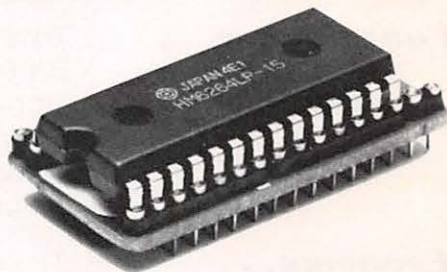


## 8K Expansion RAM

For the Model 100 & 8201

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**These Modules are easily user installable  
and they feature:**

- Low Power CMOS Static RAM
- 30 Day Satisfaction Full Refund Policy
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# USE YOUR DESKTOP COMPUTER AS A DISK DRIVE FOR YOUR M-100.

New!  
IBM PC MS/DOS  
version works over  
the telephone!

# Disk+

on Snap-In™ ROM

## Try Disk+ for 30 days. If you aren't as excited as we are, return it for a full refund.

When we designed *Disk+* we did it out of necessity. We wanted a way that we could just connect a Model 100 to our desktop computer with a cable and save files onto the desktop's disk drive. We wanted it to be so simple to use it would be self-explanatory.

Picture this. *Disk+* comes to you on a Snap-in ROM and a diskette for your desktop. You take a quarter and open the little compartment on the back of your Model 100. Then you just press the ROM into the socket. *Disk+* appears on your main menu just like a built-in.

You connect your Model 100 to your other computer using an RS232 cable (available from PCSG for \$40).

You just place the *Disk+* diskette into the desktop's drive and turn on the computer. It powers up automatically and says "awaiting command" on your desktop's screen. Then you just put the widebar cursor on the Model 100 main menu on *Disk+* and press ENTER. You are shown your RAM files arranged just like the main menu.

To save a file to your other system's disk drive, you just move the widebar cursor to the file you want to save and press ENTER. It is saved instantly with no further action.

To look at the disk directory, you just press a function key on your Model 100. You see immediately the disk directory on your Model 100 screen, and it is arranged just like your Model 100's main menu.

To load a file from the diskette to your Model 100, you just move the widebar cursor to the file and press ENTER. The file is transferred to your Model 100's RAM instantly. You can press F8 and go back to the main menu, and the file you loaded from diskette is there, ready to use.

It is so nice to be able to keep your documents, programs (both BASIC and machine code) and *Lucid* spreadsheet files on the diskette, and bring them back when you need them. All files are ready to run or use with no changes or protocol by you.

**If you have access to a desktop computer and don't have *Disk+*, then evidently we have done a poor job telling you about it.**

All files and programs that you load or save, go over and come back exactly as they are supposed to be because of full error checking. This guaranteed integrity is really a comfort. *Disk+* is wonderful in so many other ways. For example, you can do a "save all" of all your RAM files with just a touch of a function key. That group of files is saved on the diskette under a single filename with a .SD (for subdirectory) extension. Any time you want, you can bring back all those files at once, or just one or two if you like, again with one-button ease.

*Disk+* takes up no RAM. That's zero bytes either for storing the program or for operating overhead.

What really excites most *Disk+* users is text file cross compatibility. Your Model 100's text files are usable on your desktop computer, and your desktop's text files become Model 100 text files.

This means you can write something on your Model 100, and with *Disk+* transfer it

instantly to your desktop and start using it right away on your bigger computer. Or the way we like to work is to type in a document on the desktop computer and then transfer it to our Model 100 with *Disk+*. Then we print out the document, beautifully formatted, using WRITE ROM.

*Disk+* works with just about every micro sold, from IBM PC and its clones, to all Radio Shack computers (yes, all), to Apple II, Kaypro, Epson and most CPM. Just ask us. More than likely, your computer is supported.

Incidentally, hundreds of Model 100 owners have gone to their Radio Shack stores and bought a color computer because it is so low priced, and with *Disk+* they have an inexpensive disk drive.

And if that weren't enough, how about this: *Disk+* also provides cross-compatibility between different computers like IBM, Apple or the Model 4 using the Model 100 as the intermediary device. Quite a feature!

The snap-in ROM is really great because you can use other ROMs like *Lucid* or WRITE ROM. They snap in and out as easily as an Atari game cartridge and you never lose your files in RAM.

Anyone who ever uses *Disk+* simply can't do without it. But so many times we have had new users call us and say, "Wow! I had no idea when I ordered it that *Disk+* would be so fantastic. I just couldn't believe that I could use my desktop computer's disk drive with my Model 100 just like it is another main menu."

That's why we sell *Disk+* on a thirty-day trial. If you aren't completely satisfied, return it within thirty days for a full refund. Priced at \$149.95 on Snap-in ROM. MC, VISA, AMEX, or COD.

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Circle 132 on reader service card.

See you saw it in PICO

**ALSO AVAILABLE FOR  
THE MODEL 200.**

PICO'S JOURNAL JANUARY 1986

37



It's the Holmes Engineering/PCSG "chipmunk"

**PORTABLE**

# Disk Drive

for the Model 100/200

**As Fast as ROM**

**\$499**

**Includes a library of  
six powerful programs**

Uses the main menu concept. You see the disk directory instantly, arranged on your M-100 screen like your main menu. Just move the widebar cursor and transfer files with a function key. You can run a file directly from the diskette with the ENTER key. Uses 3½" microfloppy diskettes that have a rigid plastic casing and a metal core. They're tough and nonflexible. You can carry several in a shirt pocket without damage. There's 358K on a diskette. Ten of these in your briefcase and you've got 3½ megabytes.

Drive weighs only three lbs. and it works directly from the 110 outlet and recharges at the same time. It recharges in six hours with thousands of pages transferred between charges. It's compact, with dimensions of 2¼" x 5½" x 7.5"; and fits easily into your briefcase along with your Model 100 or 200.

Machine code programs, BASIC programs, *Lucid* files and documents all are saved and retrieved with no protocol—instantly, ready to run.

In a special association, Holmes Engineering and PCSG have worked together combining the hardware knowledge of Holmes and the software expertise of PCSG. The result is a product that can only be regarded as excellent.

**You see the disk directory  
instantly; works just like the  
main menu**

Here is what is really exciting. The portable disk drive has Random Access. Included as part of the operating system in the drive (ROM) is a very powerful disk BASIC.

This means that you can have BASIC programs that will access the diskette and read and write records directly on the diskette.

Just imagine yourself with this kind of capability.

*Database*—The portable disk drive stores your mailing list, inventory items, part #s and descriptions or any other data that you need to recall.

## 358K on a diskette

*Invoice (purchase order)*—At the touch of a button you can print out your sequentially numbered, professionally done invoices. This is truly professional invoicing capability.

Purchase orders are just as easy.

*Sort*—This excellent utility allows you rapid sorting of any records you have compiled. You can write the newly sorted list back in the same file on the diskette or to a new file.

*Telecom interface*—If you are a user that likes to access other computers or databases (for example CompuServe) by telephone then this powerful facility alone is worth the price of the disk drive. You can automatically download and upload information onto the diskette.

*Calendar*—Everyone who has seen this program has said, "This is the first calendar/

diary/scheduler on any computer anywhere that I can use. It is so functional."

The calendar program is usable for two reasons, first it is designed correctly, and second you have the memory (358K) on the diskette to log and access a tremendous amount of notes over a long period of time.

*Personal Finance Manager*—This wonderful program truly lets you keep track of your finances.

All your records are kept on the diskette. Bank accounts (checking and savings) and charge accounts such as MasterCard and Visa.

We at PCSG believe we have the ultimate Model 100 system, the Portable Disk Drive plus the *Lucid* spreadsheet on snap-in ROM, *Write ROM* word processing and the new 64K RAM expansion now available from PCSG.

We want you to find out for yourself at no risk. If you aren't totally satisfied within 30 days, simply return the disk drive for a full refund. Priced at \$599.95, including the software library. MC, VISA, AMEX, or COD.



**Ask about our new  
\$399 Budget Model**

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**PCSG offers a 30-day/money-back trial!**

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# DON'T MISS THE LATEST ADVANCE IN MODEL 100/TANDY SOFTWARE

## X-TEL™ by the creators of

- Use TEXT while online in TELCOM:  
Download letters and upload a reply in  
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other computers, bulletin boards, and  
information utilities
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protocol
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other desktop communications software  
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Specify Radio Shack Model 100 or Tandy 200 computer  
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## NEW MASS STORAGE SYSTEM FOR ONLY \$69.95 Great Performance—Incredible Price



A&J Micro Drive would like to announce its new portable System 100. This mass storage system, designed for the Radio Shack Model 100, offers high speed storage for the price of a cassette.

The System 100, with electronics and software designed by A&J Micro Drive, uses the latest Micro Wafer Technology developed by Entrepo Inc. The new system combines high speed digital electronics with low cost, high performance Micro Drive Technology.

### INTERESTED???

The 100's compact operating system is smaller than that of the Radio Shack Disk Drive. The latest release of the operating system may be down loaded by calling the computers at A&J Micro Drive using the simple instructions included with the unit.

The System 100 may be small enough to fit into a corner of your briefcase and requires only 4-"AA" size batteries for months of use but don't be fooled, our new unit is packed with state of the art electronics. It will give you ultra reliable program loading as fast as the disk, and twenty times faster than the cassette.

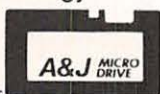
The System 100 uses a miniature end-less loop tape cartridge called a Micro Wafer. The Micro Wafer, approximately the size of a credit card, is completely enclosed in a protective housing. A built-in cover retracts as the tape is inserted into the drive, exposing the video-grade digital magnetic tape to the read write head. Micro Wafers come in several lengths, allowing the customer to choose the length best suited to his application.

### STILL INTERESTED???

The price of \$69.95 includes a drive system with cable attached, one Micro Wafer, operating instructions and one year membership to the A&J Bulletin Board. Price effective through 1985. Wouldn't you like to have one under your Christmas Tree?

### Manufacturer's Specifications

System 100  
A&J Micro Drive  
1050 E. Duane Ave. Ste "I"  
Sunnyvale, CA 94086  
(408) 732-9292  
Price: \$69.95  
Baud Rate: 14,000 bits/second  
Tape Speed: 8 inches/second  
Capacity: 2K Bytes/foot tape  
10' = 20K Bytes  
62' = 124K Bytes  
Lengths: 10', 20', 35', 50', and 62'  
Power Supply: 4-"AA" cells  
Connection: Uses RS-232 Port  
Cable: 30 inch RS-232 attached  
Size: 6x4x2.5 inches  
Weight: 24 ounces



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WE'RE STARTING OUR THIRD YEAR. AND WE'VE LEARNED A LOT.

We've put thousands of hours into picos since we opened in 1984. And we learn something new every day . . . whether it's about a new machine that we're putting through the wringer, or an offbeat application that we're trying to set up. There are a lot of questions to be answered. And we have most of those answers. We can quickly assess the merits or demerits of any pico. Our expertise can work for you, especially if you're just entering the pico market. Give us a call.

We currently recommend these picos:

GRID Case  
NEC 8200  
Quadram Datavue 25  
Product to be announced soon

We can advise you on these picos:

Bondwell II	Kaypro 2000
Epson Geneva	Morrow Pivot II
HP Plus	Sharp 7000

We recommend these portable printers:

Axonix  
Ergo Hush 80  
Epson HS 80

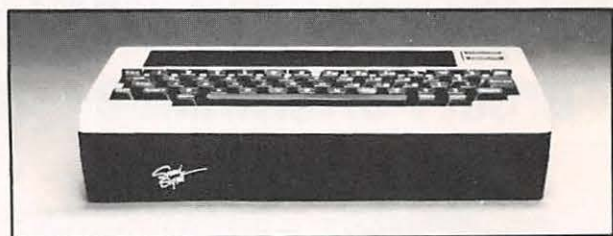
Quantity discounts available.

## *Portable Computers*

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# 512K



## NOW YOU CAN EXPAND YOUR MODEL 100 UP TO 512K

- **Latest Technology**—uses magnetic bubble memory
- **Non-volatile Memory**—if power fails, data is not lost
- **No Bank Switching**—also built-in error detection
- **One year Warranty**
- **Fully Portable and Easy to Install**
- **128K**—cost \$1050 (includes software) Each additional 128K—\$450.

**SoundSight Magnetic Bubble Memory Inc.**

2807 Pelham Place, Hollywood, CA 90068

(213) 463-1519

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**Changes your Model 100 into a totally different computer with capability you never thought possible.**

**Lucid<sup>TM</sup>**  
on Snap-In<sup>TM</sup> ROM

Infoworld  
rated Lucid's  
performance  
"excellent"

**PCSG says "Satisfaction Guaranteed  
or your money back within 30 days!"**

LUCID<sup>®</sup> is here now. It is on a ROM cartridge that snaps into the compartment on the back of your Model 100. It takes no memory to load and no memory for operating overhead. That means you have the full 29.6k bytes free to store your data.

First, LUCID<sup>®</sup> is memory conserving. It will let you build a large spreadsheet—255 row by 126 column capacity. You build huge spreadsheets in your Model 100's RAM that could consume 80 to 100K on a desktop computer.

Secondly, LUCID<sup>®</sup> is fast. LUCID<sup>®</sup> is so rapid, a 36 column corporate financial statement took less than 4 seconds to calculate.

Thirdly, LUCID<sup>®</sup> has features you won't find in most other spreadsheets. For example, when you type a label (text) it will cross column boundaries; in other words when you type a label or title it will appear as you type it irrespective of column or width. LUCID<sup>®</sup> also allows you to set column widths individually, and of course LUCID<sup>®</sup> has insert row and insert columns, as well as other standard features. LUCID<sup>®</sup> even lets your formulas refer to cells in other spreadsheet files.

Further, LUCID<sup>®</sup> has what no other spreadsheet has: Cut, Copy, and Paste. It uses the same keys as Cut and Paste in TEXT, but here's the difference: it takes all the formulas with it when you paste and they all automatically recalculate with the entire sheet.

And here is what is really amazing. You can copy or cut from one spreadsheet and paste into another spreadsheet or even a TEXT file.

LUCID<sup>®</sup> supports all BASIC math functions as well as Log, sine, cosine, tangent, exponentiation and other sophisticated math functions.

LUCID<sup>®</sup> has so many features that you will say "this is what I need in a spreadsheet", such as automatic prompting of an incorrectly typed-in formula showing just where the mistake was made.

LUCID<sup>®</sup> has expanded "go to" functions that remember and produce a windowing capability.

But perhaps most remarkable is that LUCID<sup>®</sup> is not only a spreadsheet but a program generator as well. First, LUCID<sup>®</sup> lets you protect all cells against entry or change, and then unprotect just the cells you want for someone else to use as input fields.

LUCID<sup>®</sup> will not only process values, but text input as well so that the facts other than numbers can be responded to. LUCID<sup>®</sup> has the ability for you to refer in a formula to cells containing words. This feature combines with the capacity of doing "if then" statements that work by doing table lookups against even massive X/Y charts of text or numerical information. You can produce a program that responds to inputs with no programming knowledge whatsoever.

You can prepare a report section in your spreadsheet with instructions to your user for printout, and they can produce a personalized printout that responds to their input. All your formulas and tables that did the calculations and provided the facts are invisible to that user. LUCID<sup>®</sup> is useful for doctors for patient questionnaires, troubleshooting technicians, purchase clerks, people doing job quotes, stores for customer workups, insurance agents and anybody who needs to process specific facts and numbers to produce a report based on those responses.

LUCID<sup>®</sup> comes with a manual that explains not only the characteristics of LUCID<sup>®</sup>, but will train you how to use a spreadsheet even if you have never seen one before. You are shown how to do budgets, forecasts, breakeven analysis amortizations and many other types of personal and business reports and calculations.

User friendly is such an over-used term in this industry, but a typical comment has been "I have never seen a spreadsheet that does so much, and yet LUCID<sup>®</sup> is so much

easier and faster to use."

LUCID<sup>®</sup> is a result of a most exhaustive developmental effort in which PCSG's objective was to develop a spreadsheet that was better than the state-of-the-art. We are so pleased because LUCID<sup>®</sup> provides for the Model 100 spreadsheet capability you cannot equal on a desktop computer.

LUCID<sup>®</sup> is, in our opinion and that of those who have examined it, a breakthrough. We sell it on a 30 day trial. If you are not completely satisfied, return it within 30 days for a full refund. Priced at \$99.00, on snap-in ROM. MC, VISA, AMEX, or COD.

First with  
software for  
the Model 100

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Say you saw it in PICO

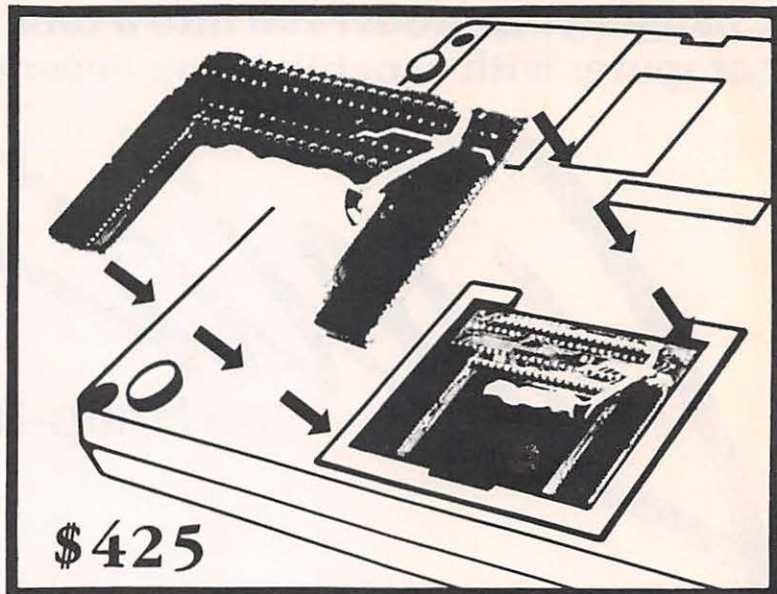


Give your Model 100

# 128K

Installs as easily  
as plugging  
in a socket

# RAM



Software included, transfers from bank to bank. Works like main menu! Includes powerful RAM Basic that lets programs store and access data from any other bank.

**PCSG says: Satisfaction guaranteed or your money back within 30 days**

As amazing as it seems you can upgrade your Model 100 to 128K of RAM in just 60 seconds.

It comes to you right out of the box looking just like the picture. You just open the little compartment on the back of your Model 100 with a quarter and it just pushes right into place. You can then put the cover back in its place.

You then have 4 banks of RAM of 32K each. The additional three banks also work just like your Main Menu.

You push a function key and you are in the second bank. Push again and you are in third, again, then fourth. Press it once again for your original bank.

It has its own built-in NiCad battery that recharges right from the Model 100 and its guaranteed for a full year.

What is really great is that you can copy a file from one bank to another with just a function key.

Each bank is like having another Model 100, and all the built-in programs as well as any snap-in ROM programs appear in all four banks and work the same way. Your widebar cursor moves from file to file and you access any file or run any program just by pressing ENTER.

What lets you copy any file from one bank to another is a snap-in ROM from PCSG called RAM+, that comes at no extra charge. It just pushes right into the little socket in that same compartment with the 96K expansion unit.

Not only does this firmware let you copy a file from bank to bank, but you can make a copy of any file within the same bank instantly with a function key. Great for Lucid spreadsheets!

## Copy a file from bank to bank with a function key

You can also rename a file, or kill any file with just a function key. Plus you can do a whole lot of other useful things like setting the date, day and time with function key ease. You even have a function key that lets you use non-Radio Shack printers without having to make those tricky dipswitch settings.

RAM+ lets you cold start any one of your banks without affecting the other three. That means that anytime you want you can clean out a bank's entire memory, but leave intact all the files in the other banks.

What is also fantastic is that you don't have to have the ROM in place to use the additional RAM. Whenever you take out the snap-in ROM it leaves behind a tiny machine code program that lets you switch from bank to bank just by pressing ENTER.

This lets you use your ROM socket to snap-in other ROMs like LUCID spreadsheet, WRITE ROM text processor, or DISK+ ROM file transfer program, and use them in any or all four banks. All of these, by the way, are available from PCSG.

When you are ready to copy a file from one bank to another or use any of the other fantastic functions we talked about you can just snap the RAM+ ROM back into place.

Everybody that has this 128K system in their Model 100 is so excited, because it gives them four times the capacity and all banks work just like the Main Menu.

And what has made a lot of people happy is that the system bus, located in the same compartment, is left free for you to plug in a DVI or the Holmes Engineering/PCSG portable disk drive.

The ability to copy a file from bank to bank instantly with a function key, plus all of the other features make this RAM extension truly an engineering masterpiece.

Some people hesitate when they think of installing something, and then others are skeptical that any additional hardware could be as good as the Model 100 itself. That's why we sell these 96K expansions on a 30 day trial. Simply return it within 30 days for a full refund if you are not satisfied. Priced at \$425. MC VISA COD.

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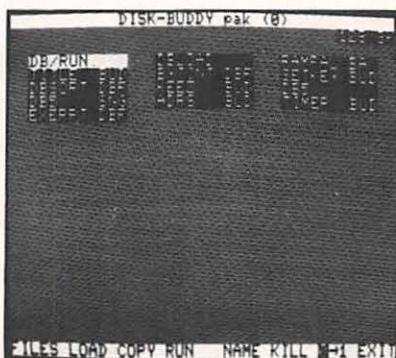
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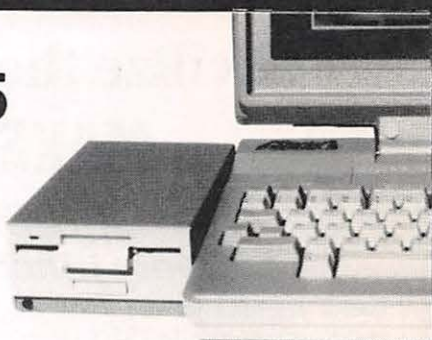
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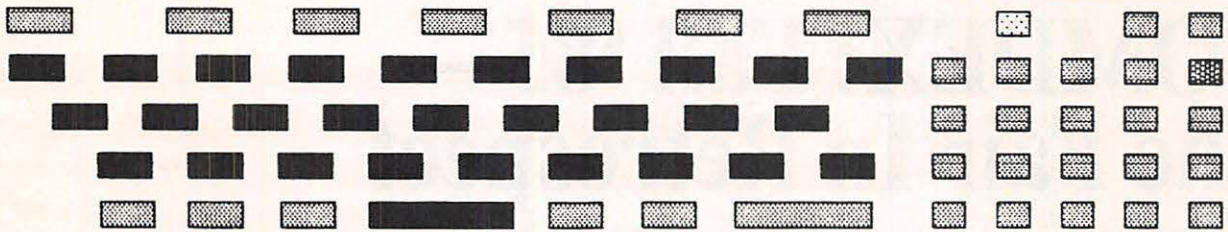
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# COMDEX: Fall '85— The Fair In Retrospect

by Terry Kepner

Just what makes COMDEX/Fall so important that it can totally absorb the interest of the entire computer industry for several weeks before and after the event itself? In a word, COMDEX/Fall is the computer industry.

Comdex is the largest single yearly computer show (or circus, as some say) in the world, with over 1,200 exhibitors and 80,000 attendees at this year's show. All the important players in the computer industry are there as exhibitors, exhibitors' representatives, or as attendees looking over the exhibits. And even companies that don't officially attend send their representatives to meet and talk with the companies that are attending.

For the exhibitors, Comdex is a chance to show off their products to all the major magazines, newspapers, press people, and computer hardware/software buyers and distributors at one fell swoop. Comdex/Fall is an annual event scheduled each year for the week before Thanksgiving in Las Vegas.

For the attendees, Comdex/Fall is an exhausting event where you can see almost every computer hardware and software product gathered under one roof—actually, six roofs. To visit all the booths is no minor accomplishment. Comdex/Fall 85, from November 20 until the 24th, occupied the entire Las Vegas Convention Center including the West Hall, the exhibit halls of the MGM Grand, the Las Vegas Hilton, Caesar's Palace, and the Riviera Grand Hotels. The combined floor space was easily the size of four football fields: The Convention Center itself is the size of two fields.

## The First Impression

Your first impression on entering the Convention Center is simply: "They've got to be kidding". Stretching out in three directions from the entrance, as far as you can see (is that a wall way off in the distance, or just the sides of booths?) are the exhibit booths. Some are large, most are small, but a few are gigantic. None are cheap. For example, the Tandy Computer booth, one of the giant booths, cost over \$250,000 to build and was manned by a flock of over 100 employees. The main hall, the largest,

is the focal point of the show and has the fanciest booths and the highest exhibitor prices.

A very few booths actually provided entertainment. Burroughs hosted an hourly magic show. The majority of the booths concentrated on showing off the products with continuous demonstrations.

The show was so massive that it was literally impossible to visit all the exhibition locations in one day. Each of the hotels took two or three hours to cover, and the main hall took an entire day by itself. But you could see everything if you wanted to devote three or four days to nothing else but looking—and the nights to soaking your tired feet.

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*"We saw four new  
laptop computers."*

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While the show doesn't have a great number of new product announcements, you can find an amazing number of products released earlier in the year that you never heard about. This is what makes the Comdex/Fall such a well attended computer show: There is so much happening in the industry that there isn't any one source available to document new products or to track old ones. Comdex/Fall helps fill that gap by providing a place where everyone can get together and arrange to meet with almost any attending company.

One of the show's great attractions for an attendee is the many freebies given out by companies trying to attract attention or to bribe your recall back home at the office. These run the gamut from coffee cups and pens with company logos to T-shirts with your digitized portrait. Toshiba was demonstrating their new color printer by printing attendee portraits on heat-transfer paper and sealing the portrait to a shirt. And, of course, there are contests with prizes ranging from coffee cups (again) to free software products—with one company offering use of a Rolls Royce limo for one year.

Since the main purpose of the show is for manufacturers to show off their wares to

dealers and distributors, the number of private individuals attending was definitely in the minority. However, at most computer shows the majority of attendees are individual buyers.

## IBM-oriented Products Predominate

The most disappointing aspect of the show this year was the predominance of IBM-oriented products. Sure, Atari, Commodore, Apricot, and several other non-MS-DOS computer companies were in attendance, but by far the majority of support was for the MS-DOS market, both in hardware and software. For those interested in the MS-DOS market, the show was a definite success with thousands of products on display.

For people interested in the other computers on the market, the show was frustrating. Access to products in these other markets is only available through magazines and local computer shows—local to the manufacturer, that is.

## The New Picos

At this year's show we saw four new laptop computers, two of which are already being advertised. The first is the TAVA portable, an MS-DOS machine with two 5¼-inch drives). Second is the Dulmont Magnum, also known as the Kookabarra, which is an MS-DOS machine with bubble memory. Third is the Toshiba Portable, an MS-DOS pico with a 3½-inch disk drive. The Ampere WS-1 has bubble memory and the programming language APL as its operating system.

All four are light in weight—under 12 pounds. Three use LCD screens, one has an electro-luminescent display. Comprehensive reviews will appear in up-coming issues of *PICO*. We also saw many new products of interest to portable computer owners that we will share with you in the coming months.

All-in-all, I found Comdex/Fall to be an exhausting educational experience. Although some of the offerings deserve to be called boring—there was the usual junk you see at shows—by far the great balance of booths presented interesting hardware and software in a fascinating manner. ■



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\*ROM-VIEW 80 is not currently available for the Tandy Model 200. Model 200 customers will receive a coupon for a free copy of TS-DOS. Trademarks: ThinkTank—Living Videotext, Inc., Guardian—PEAC, Multimate & dBASE and Ashton Tate, R:base 5000—Microrim, Inc., WordStar—Micropro, Inc.

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Write ROM — the definitive word processor for the Model 100. Function key formatting or dot commands. Search and replace. Library feature — inserts words, phrases or whole documents into text from just a code. MAP lets you see a picture of your document. In all there are 60 features and functions. No one can claim faster operation. FORM lets you create interactive forms with on-screen prompts that you can answer from the keyboard. Nothing else for the Model 100 compares with the features of Write ROM. Exactly the same as the Write ROM sold as a single program. Infoworld says it "makes the Model 100 a viable writing unit ... sur-

passed our highest expectations for quality and clarity."

Lucid Spreadsheet: This is the one PICO magazine says "blows Multiplan right out of the socket" and Infoworld performance rated as "excellent" and said "makes the Model 100 compute." Gives you features you cannot get with Lotus 123. Lets you build spreadsheets in your Model 100 that would consume 140-150K on a desktop. Program generating capability with no programming knowledge required. Variable column widths. Includes find and sort with function key control. It's fast, recalculates like lightning. No feature has been taken from the original, only new ones added.

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As usual PCSG sells the Super ROM on a thirty day guarantee. If for any reason you are not satisfied, simply return it for a full refund.

We are excited about this product. Super ROM gives the Model 100 the true power of a desktop. No other multi-program ROM has software that compares. But don't take our word for it. We invite you to make that comparison yourself. Priced at \$199.95 on Snap-In ROM.

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